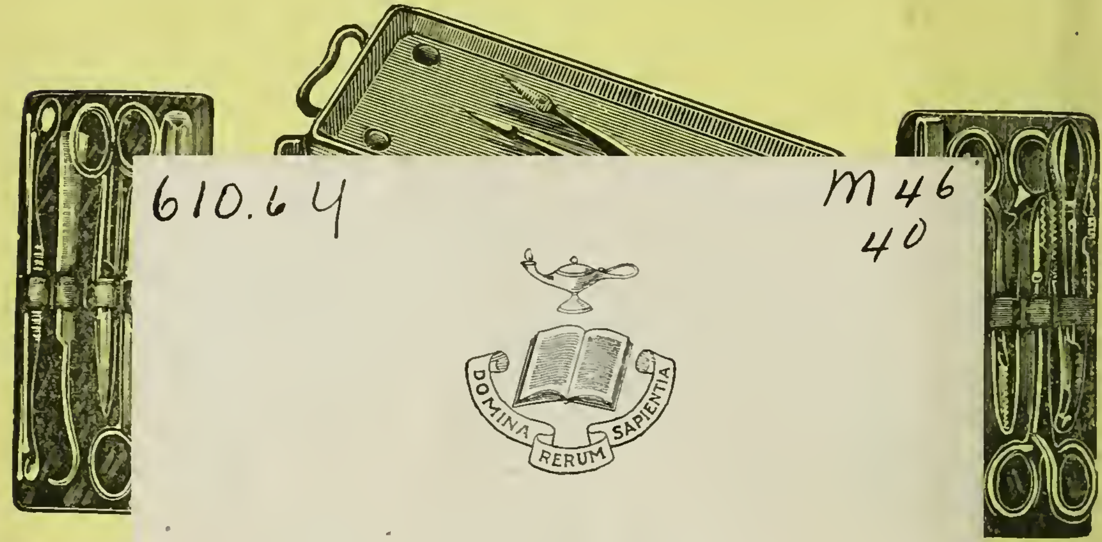
MEDICAL ANNUAL

Aseptic Minor Operating Instruments
WITH
Seamless Metal Case Sterilizer.



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Wh … s in the
metal c … ase, the
dimensic…

The … l out in
one piec … Lamp.

The…

Needle H…
Straight Aseptic Dressing Scissors
Curved ditto ditto
Splinter Forceps
Combined Spatula and Tongue Depressor, with Frænum Slit
Tenaculum

Spencer Wells Forceps
Pean's Artery Forceps
Double Volkman's Spoon
Director and Aneurism Needle
Two Probes
Six Operating Knives
Needle Case with six Needles

Price for the whole set complete - **£5 5s. net.**

R. SUMNER & CO. Ltd.,
Surgical Instrument Makers, LIV

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DOMINA RERUM SAPIENTIA

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The very latest of Electrical Treatment

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The most perfect Outfit for Facial, Head, & Body Massage.
Complete in Carrying Case & 3 Electrodes, Treatment Chart, and Instruction Book.
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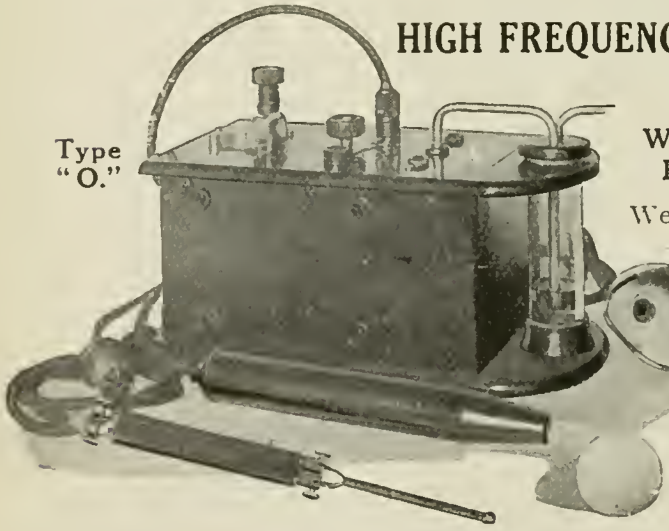

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Complete with all Attachments and 3 Electrodes, Treatment Chart and Instruction Book.

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THE BRITISH ASSOCIATION

FOR THE ADVANCEMENT OF

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(INCORPORATED).

(Abbreviated Title, "B.A.R.P.")

THIS Association, which has now been in existence for four years, was founded to give corporate expression to the views of medical men interested in X-RAYS, ELECTRICITY, and Physical remedies in general; and on the executive side, to carry out EDUCATIONAL WORK, and to support its members in their DEALINGS WITH PUBLIC AUTHORITIES. It has succeeded in getting University Diplomas established in Radiology and Electrology, and, through its very adequate representation upon the Council of the SOCIETY of RADIOGRAPHERS, keeps in touch with the training of expert technical assistants.

So far as the D.M.R. and E. (Camb.) is concerned, in addition to the Classes held at Cambridge, courses for Medical men are conducted in LONDON by the Education Committee of the B.A.R P, and are recognized by the University as qualifying for admission to its Diploma Examination.

The entrance fee to the Association is **£1 1s.**, and the annual subscription **£3 3s.** This includes the official Journal, the "ARCHIVES OF RADIOLOGY AND ELECTROTHERAPY," published monthly.

All those whose work lies in the above-mentioned specialities are urged to join.

Communications should be addressed to the Hon. Secretaries:

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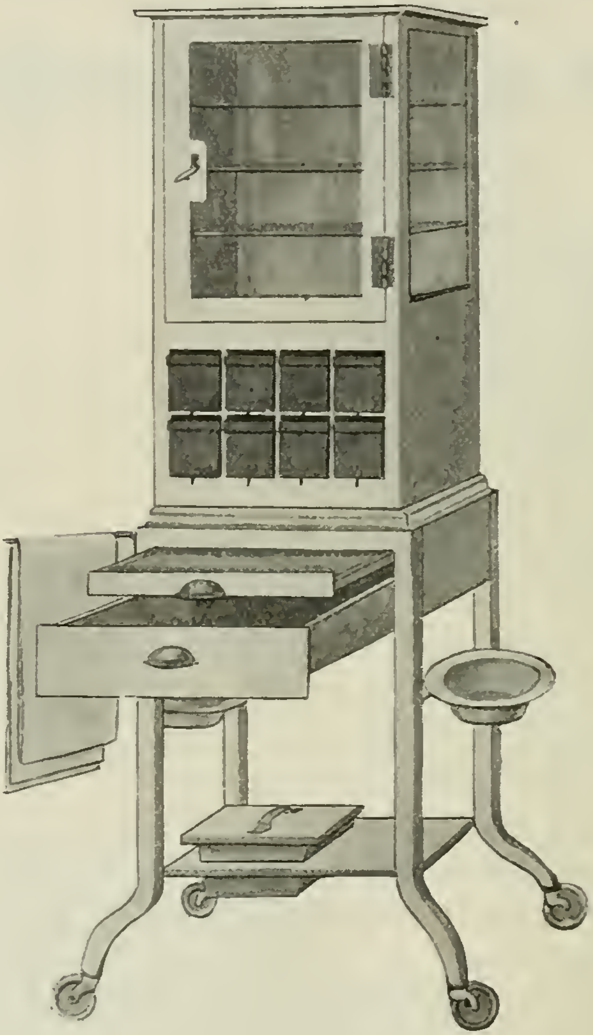
Combined Aseptic Cabinet & Stand

FOR MINOR OPERATIONS.



Size :
70 in. high,
18 in. wide,
11 in. deep.

Price,
without
Dressings,
£13 17 6
net.

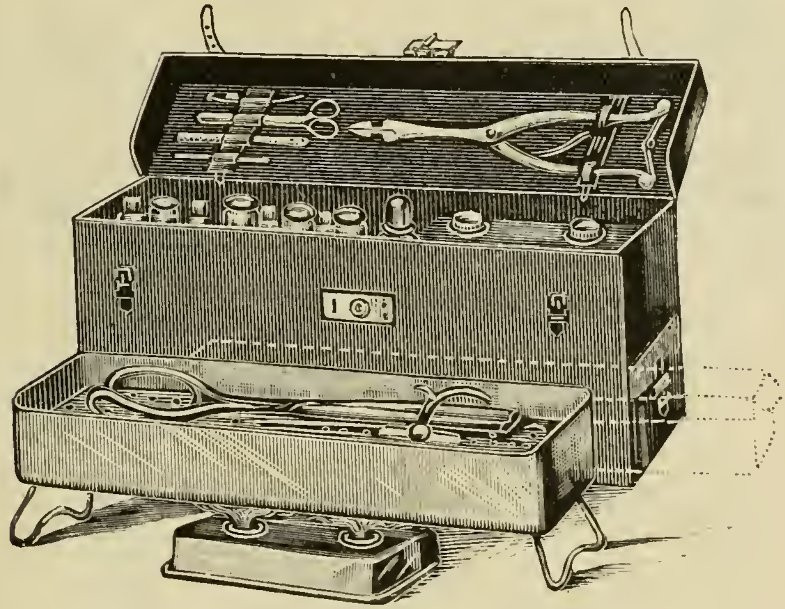
THE upper portion is a well made white enamelled Cabinet, with glass front and sides, three glass shelves, plated lock and hinges. Below are eight compartments to hold Dressings, these contain strong cardboard dust-proof boxes, to which tapes are attached to facilitate their removal from the pigeon holes.

The lower portion of the Stand has a glass instrument tray, and an enamelled metal drawer below. There are two enamelled solution bowls, and a box for soiled dressings; also an electro-plated towel rail. The whole Cabinet is on rubber-tyred castors.

R. SUMNER & CO. Ltd., LIVERPOOL.

Modern and Improved

MIDWIFERY BAG WITH STERILIZER.



The bag is made of cowhide (either black or brown) and has a compartment beneath into which the Sterilizer fits.

The Sterilizer has no seams, being blocked out in one piece from a solid metal sheet and heavily nickel plated.

The larger instruments are carried in Sterilizer, the top portion of the bag being reserved for Nail Brush, Lamp, Chloroform Bottle, Pill and Medicine Bottles, Dredger, leaving room for Apron, Gloves, &c.

The inside Cover has loops arranged for carrying the smaller instruments.

PRICE of the Bag, together with Sterilizer, Lamp, Nail Brush, Minim Measure in case, Chloroform Drop Bottle in case, Dredger, 3 Pill Bottles, 3 Medicine Bottles.

Price - **£8 (or £9 if of solid Leather throughout).**

An outside Canvas Cover can be supplied at 15/- extra.

R. SUMNER & CO. Ltd.,

SURGICAL INSTRUMENT MAKERS, LIVERPOOL.

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Beg to announce that the 47th Edition of their

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THIS LIST COMPRISES :

Drugs, Chemicals, & Pharmaceutical Preparations,
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Vaccineurine

A mixture of several bacteriolytic Vaccines which destroy neurotropic micro-organisms and which have proved after extended trials of great value in the treatment of

NEURALGIA, NEURITIS, SCIATICA, TABES.

Injections are made in the extensor muscles of the arm, if possible in the spaces between the tissues or intramuscularly in the gluteal region.

The full treatment consists of three series, in all 18 injections. These doses are graduated up to the maximum (or 18th) dose.

The first series (6 doses) may be regarded as the "Immunity" dose.

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Prepared by

THE SWISS SERUM AND VACCINE INSTITUTE,
BERNE, SWITZERLAND

Indications:

FACIAL NEURALGIA
In old-standing cases which have defied all kinds of treatment it has been found very successful.

SCIATICA
Most favourable results have been obtained in acute and chronic cases.

NEURITIS
Whether arising from exposure, alcoholic excess, rheumatism, diphtheria, &c.—a certain marked and rapid benefit has followed.

TABES
Favourably influenced.

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Sole Agents for the Swiss Serum and Vaccine Institute for Great Britain and the Colonies.
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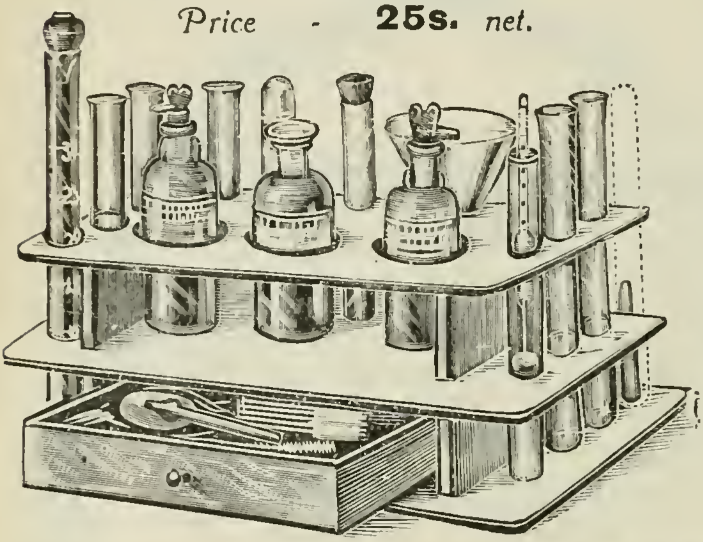
Sumner's URINARY TEST STAND

Supplied with URINARY TESTING APPARATUS and SOLUTIONS.

Price - **25s.** *net.*



The Stand is of Polished Mahogany, substantial and well made, and is quite suitable for the Consulting Room Table. The contents are as follows:

Urinometer, Albuminometer, Spirit Lamp, Drop Pipette with graduated C.C. Tube, Test Tubes, Funnel, 2-oz. Stoppered Bottle of Nitric Acid, 2-oz. Drop Bottle of Roberts' Test Solution for Sugar, 2-oz. Drop Bottle containing Esbach's Test Solution for Albumin, Test Tube Brush, Packet each Red and Blue Litmus Paper, Packets of Filter Paper, Watch Glass, Graduated Pipettes.

National Insurance New Medical Cabinet

This Cabinet is japanned black outside and white inside, and is of the very best workmanship and finish. It is provided with a lock and key.

Each Compartment is made to hold 500 Record Cards, and allowance is made for proportionate expansion for the Continuation Cards which will in time come to be used. The Cabinet is therefore suitable for a panel of 1000; for higher numbers a second one is required, as boxes to hold more cards are cumbersome, and, when full, very heavy to handle.

If Men's and Women's Cards are kept together, one set of Alphabetical Guide Cards per box is sufficient; if separately, one set is required for each compartment.

Price - **25s.** *each net.*

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Dimensions:

Length	18 in
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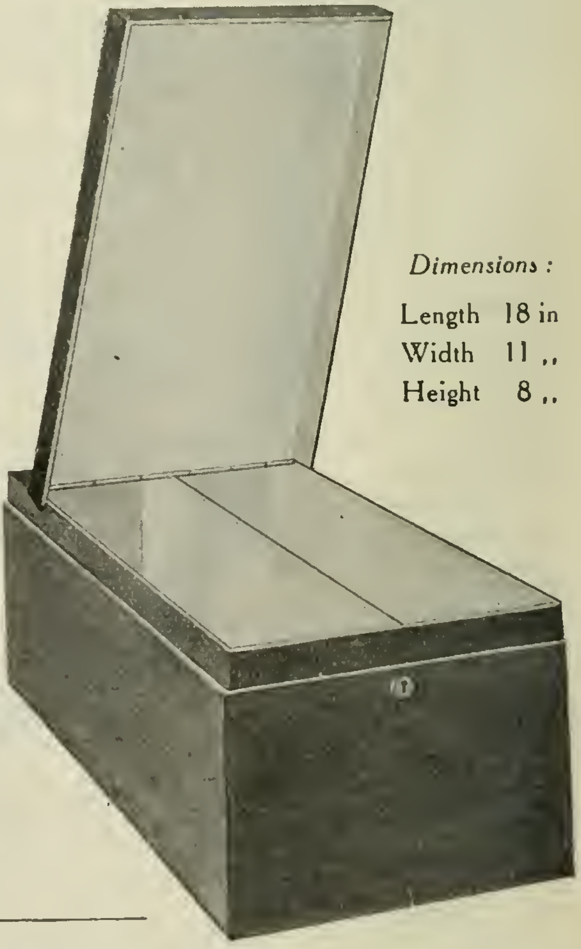

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Price - **50 guineas** *net.*

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TO FIX AGAINST A WALL OR STAND ON A MANTELPIECE.

Size: 12½ in. wide; 15 in. high; 6½ in. back to front.

Price **£3** *net.*

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TO FIX IN A CORNER OR STAND ON A CORNER SHELF.

Size: 15½ in. wide; 14 in. high; 8½ in. extreme corner to front.

Price **£3 7s. 6d.** *net.*

Carriage Paid and in Free Package.

THESE Cabinets are admirably adapted for the purpose of holding small Instruments, and are an ornamental addition to any Consulting Room.

They are made of steel, enamelled white, with nickel-plated mounts and fittings, and have one plate glass shelf. The doors, instead of being plain plate glass, have silver bevelled mirrors, which give them a handsome appearance.

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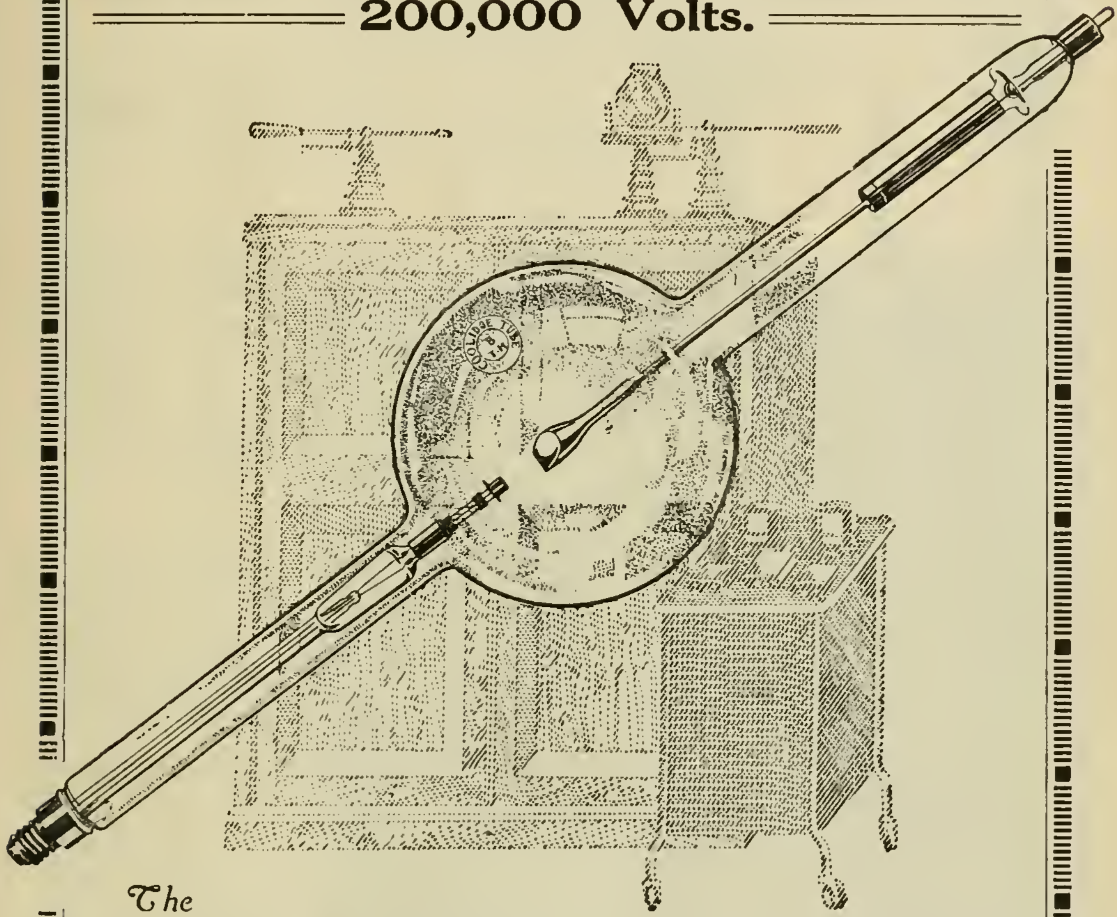
Deep Therapy.

200,000 Volts.



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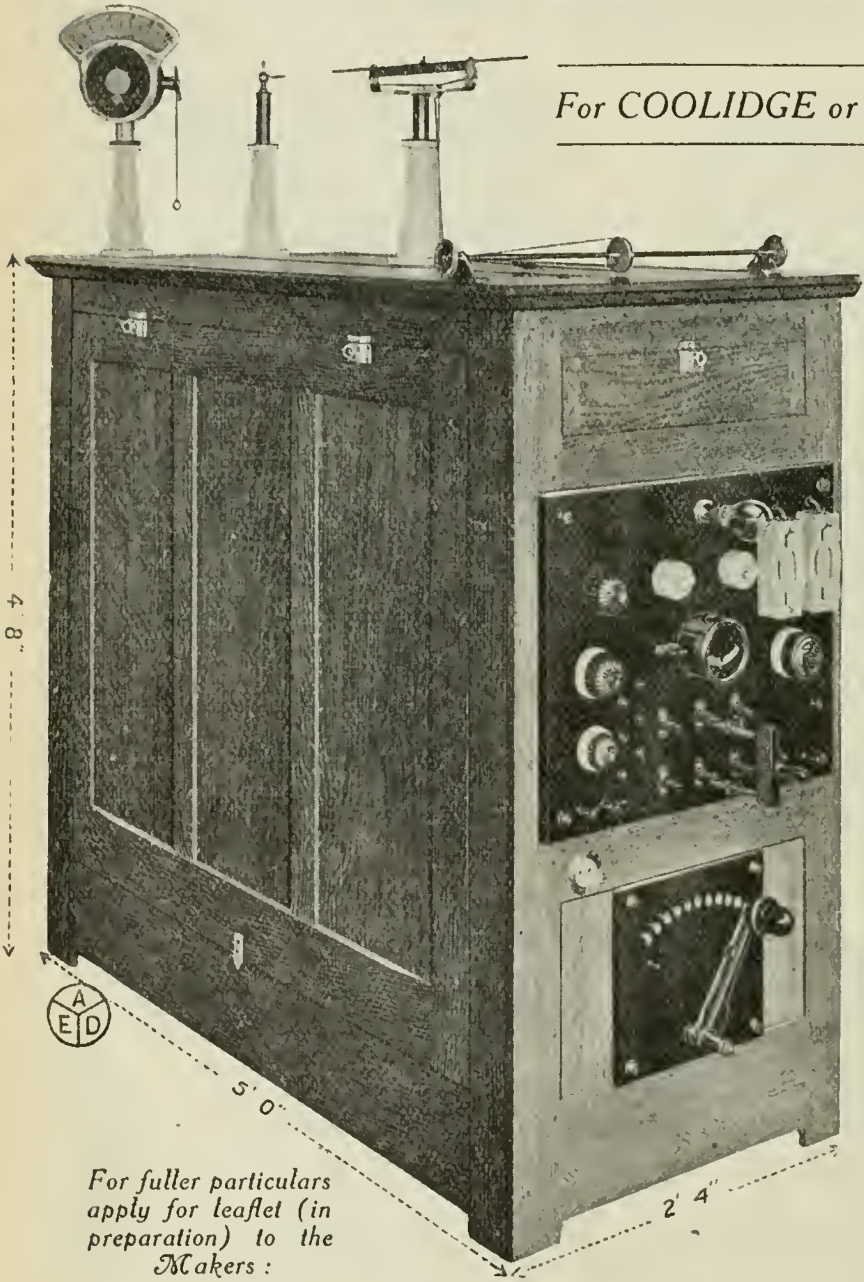

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The only Easy Reading Magnifying Clinical Thermometer on the Market.

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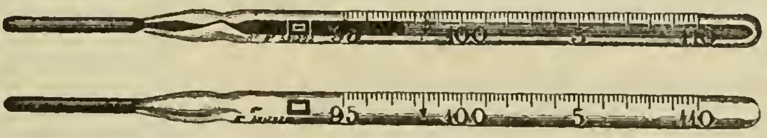

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All Thermometers supplied tested at the National Physical Laboratory.

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CLINICAL THERMOMETERS, all guaranteed tested, each **1/9, 2/-, 2/3. Magnifying Index, 3/-** per dozen extra.

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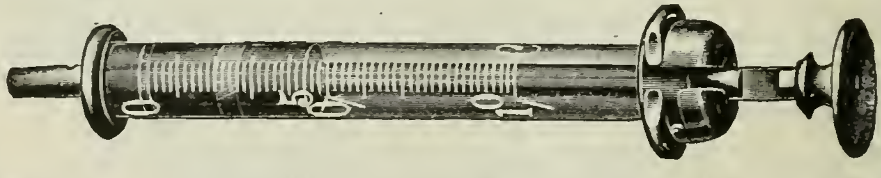

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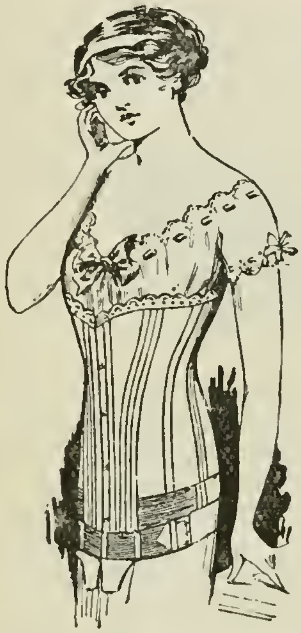
RECOMMENDED by the LEADING PHYSICIANS & SURGEONS.

Fit well, sit comfortably, and do not get out of place. They give great comfort and relief in all Abdominal Complaints, and after Operations.



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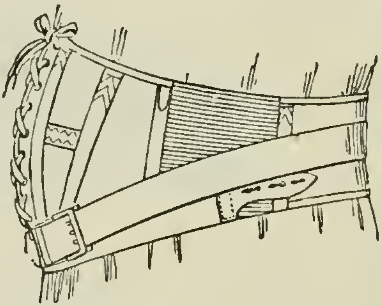

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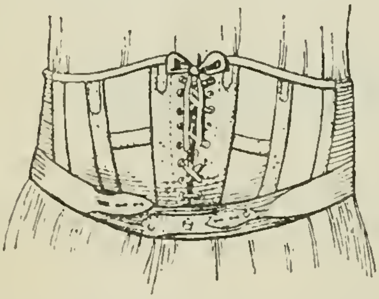

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This SYSTEM III BELT

Useful in undue corpulency, its action is beneficial when the womb is pressed against the bladder; also in the pains often felt in the hips, loins, and sides.

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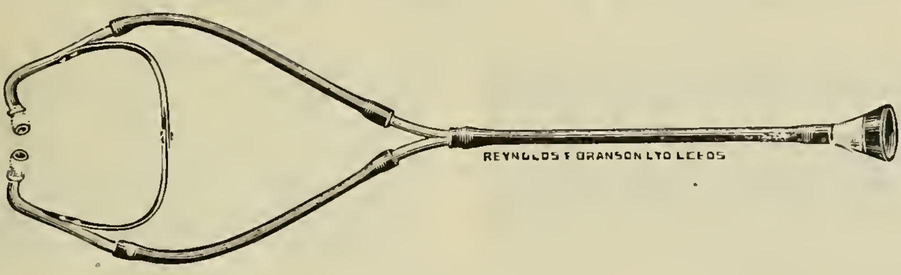

Has powerful acoustic properties; it is strongly made, the upper part being short and broad fits into the ears comfortably, and is very portable. Provided with thick walled tubing, sounds are clearly transmitted. Price ... £1 0 0

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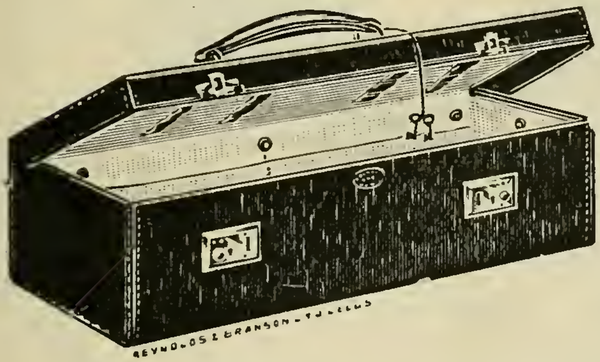

Strong, neat and portable; made of brown hide on light wooden frame, with detachable washable lining, fitted with two pockets and loops for bottles and instruments. Complete with two locks and keys.

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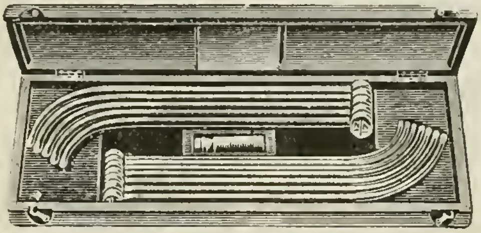

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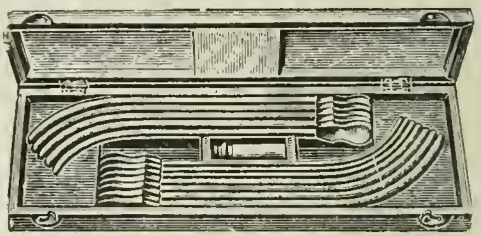
LISTER'S SOUNDS.

4/6 each

Set of 12 in Oak Case .. £3 0 0



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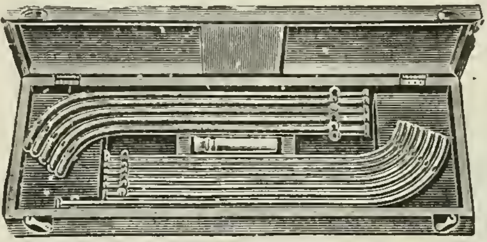

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Set of 7 in Oak Case ..	£2 2 0
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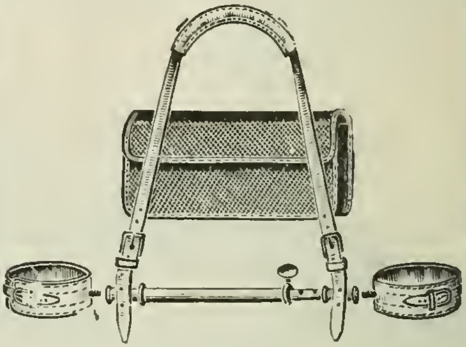

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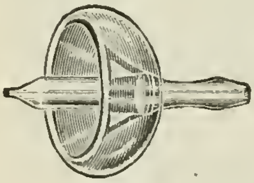

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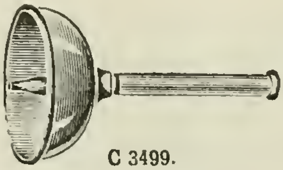

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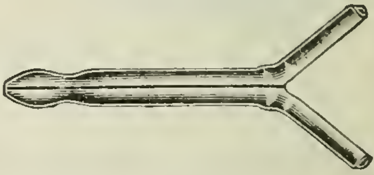

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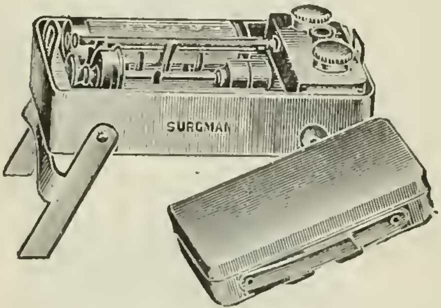

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Complete with 2 Needles, in Sterilized Case, with Spirit Lamp, etc.

20 mm.	1 cc.	2 cc.	5 cc.	15 cc.	22 cc.
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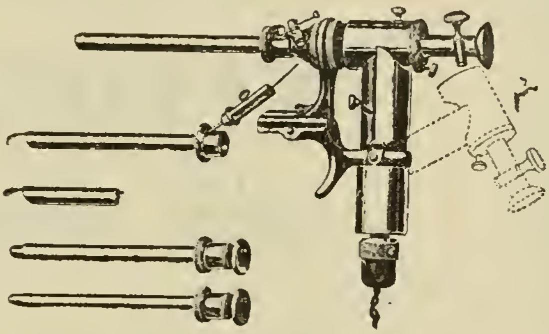

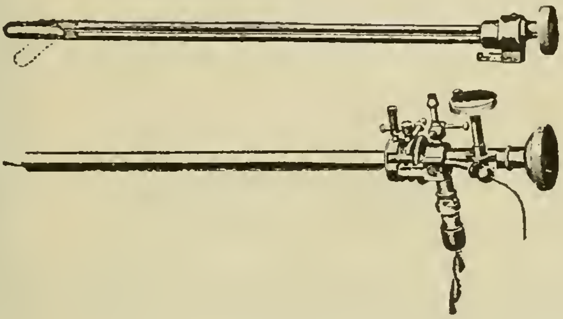

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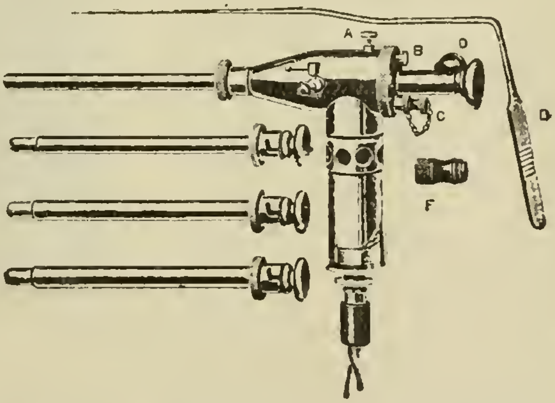

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See also page 560.

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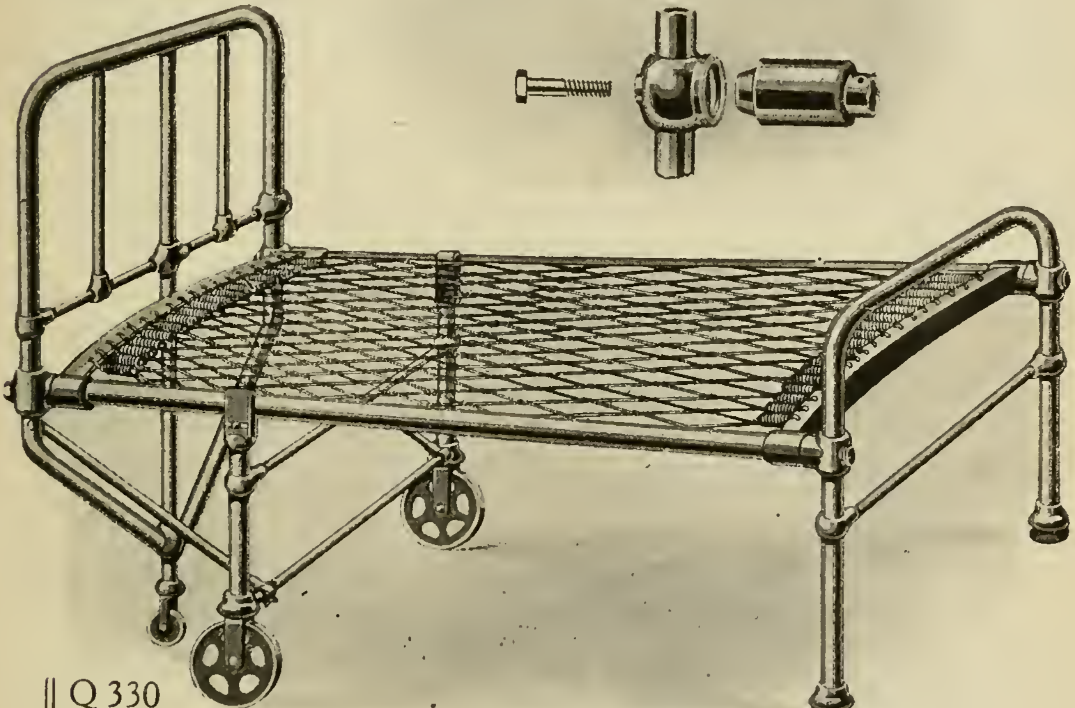

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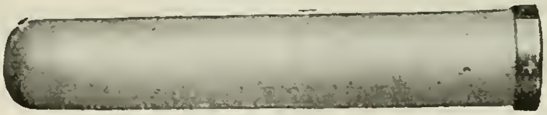

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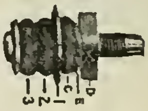

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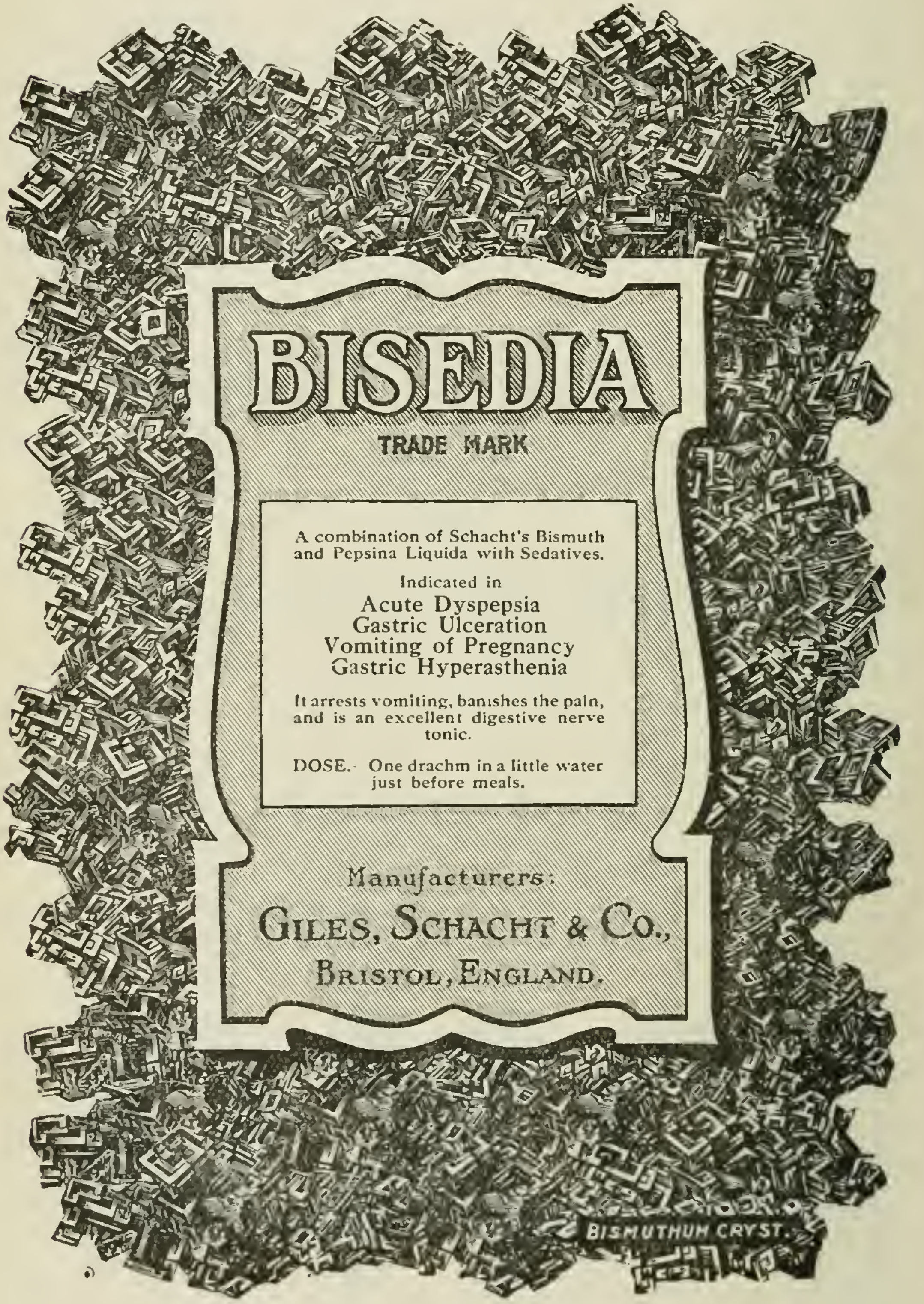
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Appendix, Surgery of—35. Colon, Surgery of—91. Gall-bladder, Surgery of—204. Hernia, Diaphragmatic—206. Hernia, Femoral—207. Hernia, Inguinal—207. Intestine, Small, Surgery of—228. Pancreas, Surgery of—329. Peritonitis—333. Spleen, Surgery of—398.

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Thyroid Gland, Surgery of—465.

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Anæsthetics—26.

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Endocrinology, a Review of the Present Position—122

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Diabetes Mellitus—99. Kidney Function Tests—234.

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Aneurysm—32. Angina Pectoris, 33. Arterial Tension, High—38. Arteriosclerosis—40. Auricular Fibrillation—42. Endocarditis, Ulcerative—121. Heart Disease, Pregnancy in—204. Syphilis, Cardiac—442. Thrombo-Angiitis Obliterans—463.

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Abortion—19. Genital Prolapse—186. Labour, Management of—243. Ovarian Headaches—328. Pelvic Infection—332. Pelvic Varicocele—332. Pregnancy, Disorders of—341. Uterus, Disorders of—493.

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Anæmia—25. Anaphylaxis—32. Ascariasis—40. Ascites—41. Coli Bacilluria—90. Glandular Fever—188. Graves' Disease—199. Jaundice, Epidemic Infectious—230. Leukæmia—249. Non-specific Protein Therapy—300. Osteomalacia—328. Oxyuris Vermicularis—328. Pernicious Anæmia—334. Poisoning—339. Rheumatism—372. Sinistrality in Relation to High Blood-pressure and Defects of Speech—386.

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Orthopædic Surgery—315.

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Acetone in the Breath—20. Blood, Bacteriology of—56. Blood, Chemistry of—56. Blood, Coagulation Time of—58. Blood, Cytology of—60. Blood-platelets—63. Cancer, Clinical Pathology of—72. Cerebrospinal Fluid—83. Duodenal Analysis—108. Gastric Analysis—174. Liver Function Tests—252. Pancreas Function Tests—329. Respiratory Function Tests—371. Sputum, Clinical Pathology of—400. Throat, Bacteriology of—462. Thyroid Function Tests—464. Urine Analysis—491.

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Psychological Medicine—352.

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Chancroid—85. Fourth Venereal Disease—168. Gonorrhœa—192. Syphilis—421.

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Electrotherapeutics—119. Radiotherapy—362. X-ray Apparatus—499. X-ray Diagnosis 499.

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Acrodynia—21. Cerebral Tumours—78. Epilepsy—142. Hiccough, Epidemic—210. Hydrocephalus—212. Infantile Paralysis—219. Meningitis—263. Multiple Sclerosis—282. Nerves, Peripheral, Surgery of—288. Neurological Surgery—295. Optic Neuritis—314. Sciatica—380. Sensory Disturbances of Cortical Origin—385. Spine and Spinal Cord, Affections of—396. Static or Posture System—400. Tabes Dorsalis—447.

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Constipation, Cæcal—93. Gall-bladder and Biliary Passages, Diagnosis of Disease of—169. Gastric and Duodenal Ulcer—183. Hæmatemesis, Treatment of—200. Pancreas, Diagnosis of Diseases of—328. Stomach, Acute Dilatation of—405. Stomach, Hour-glass—406.

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Chorea—88. Cœliac Disease—89. Dyspeptic Disorders in Infants and Young Children—110. Erythrœdema—149. Hirschsprung's Disease—211. Infant Feeding—219. Laryngospasm—245. Pyelitis in Infancy and Childhood—361. Syphilis, Congenital—443. Urine, Incontinence of, in Children—492. Whooping-cough—498.

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Asthma, Bronchial—42. Bronchiectasis—66. Hay Fever—203. Lung, Gangrene of—253. Pneumonia—337. Tuberculosis, Pulmonary—476.

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Cataract—74. Eye Affections associated with Disease of other Organs—150. Eye Affections, General—153. Eye, General Therapeutics of—162. Glaucoma—190. Ophthalmology, Preventive—313. Retina, Diseases of—371. Trachoma—473.

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Acne Rosacea—20. Acne Vulgaris—20. Alopecia Areata—22. Carbuncle—73. Darier's Disease—96. Dermatitis, Infectious Eczematoid—98. Drug Eruptions—107. Dysidrosis—110. Eczema—117. Epidermophyton Inguinale—142. Erysipelas—149. Erythema, Recurrent Scarlatiniform—149. Familial Hæmorrhages in Skin and Mucosæ—165. Fordyce's Disease—168. Glanders—188. Granuloma Inguinale—199. Herpes Zoster—209. Hodgkin's Disease—211. Impetigo Contagiosa—218. Intertrigo—228. Keloids and Cicatrices—233. Leukæmia, Lymphatic—251. Lichen Planus—252. Lupus Erythematosus—254. Psoriasis—351. Rhus Dermatitis—374. Ringworm—374. Rosacea—375. Scabies—376. Sclerodermia—381. Seborrhœa—382. Skin, Cancer of—386. Skin Diseases, General Therapeutics of—387. Skin Diseases, Protein Sensitization in—388. Skin, Epithelioma of—391. Skin, Idiopathic Multiple Sarcoma of—393. Skin, Tuberculosis of—394. Sycosis—421. Ulcer of the Leg—488. Von Recklinghausen's Disease—498. Warts—498. Xanthoma, Multiplex—499.

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Hæmorrhoids, Internal—200. Pruritus Ani—250. Rectum, Cancer of—367. Rectum, Prolapse of—369.

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Food and Food Control—167. Industrial Health—218. Infectious Diseases Prevention—222. Maternity and Child Welfare—260. School Medical Service—379.

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Mental Disease—263.

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Amœbiasis—22. Ankylostomiasis—34. Balantidiosis—46. Blackwater Fever—46. Cholera—87. Dengue—98. Dysentery, Bacillary—109. Filariasis—165. Gangosa—173. Jaundice, Infective—231. Kala-azar—233. Leprosy—247. Malaria—256. Malta Fever—260. Plague—337. Rat-bite Fever—367. Relapsing Fever—370. Schistosomiasis—378. Sprue—399. Tropical Ulcer—474. Trypanosomiasis—474. Yellow Fever—508.

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Cerebrospinal Fever—80. Chicken-pox—86. Diphtheria—104. Influenza—224. Measles—261. Mumps—283. Paratyphoid Fever—330. Scarlet Fever—376. Small-pox—395. Typhoid Fever—481. Typhus Fever—486. Vaccination—496.

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Stomach, Surgery of—407.

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Bladder, Diseases of—47. Bladder, Growths of—52. Epispadias and Ectopia Vesicæ—145. Kidney, Surgery of—237. Prostate, Surgery of—343. Seminal Vesiculitis—384. Testicle and Epididymis, Surgery of—448. Ureter, Surgery of—448. Urethra, Diseases of—490.

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Abscesses—19. Amputations—24. Bone Cavities, Septic—64. Breast, Cancer of—64. Burns—65. Cancer—69. Cervical Ribs—84. Ecchymoses—116. Elephantiasis—120. Fingers, Injuries of—166. Foot, Surgery of—168. Hare-lip—202. Jaw, Bony Ankylosis of—231. Lymphatic Glands in the Neck—254. Mouth and Face, Surgical Affections of—278. Neckless Men—287. Phrenic Nerve, Temporary Blockage of—336. Pituitary Surgery, Instrument for use in—336. Surgery, the Advance of—418. Tetanus—450. Thoracic Surgery—452. Varicose Veins—495. Vascular Surgery—497.

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Deafness—97. Ear, Middle, Diseases of—112. Endoscopy, Peroral—140. Larynx, Affections of—245. Nasal Accessory Sinuses—284. Tonsils, Diseases of—472.

Preface.

In this, the fortieth volume of the Medical Annual, we have made some slight alteration in the arrangement of the contents which we think will be of convenience to our readers.

The articles hitherto included under Materia Medica and Therapeutics have been incorporated in the body of the work and will be found in their alphabetical order. This includes the articles on Radiotherapy, Electrotherapeutics, Non-specific Protein Therapy, and also the therapy of the hormones, which is considered under the title 'Endocrinology'. Further reference to these methods will be found under the headings of the diseases in which they are employed.

The Introduction gives a concise summary of the principal facts and correlates them, so that the reader can readily refer to the various reports on any subject which interests him, and also quickly gather what is being done in other departments.

It has always been our aim that the Annual should not be a mere digest of the work of the year, but present it in the form of reviews by eminent physicians and surgeons, so that our readers may have the advantage of their special knowledge and experience; and also to publish original articles which will render information on subjects under discussion complete and up-to-date.

We are grateful to the entire staff of writers who have so ably co-operated in carrying out our ideal of making the Annual of material and permanent use to our readers.

THE EDITOR.

The Medical Annual Offices,
Bristol, England, March, 1922.

CONTENTS

PAGE
CONTRIBUTORS AND LIST OF SUBJECTS - - - - - - - li–liv
PREFACE - - - - - - - - - - lv
LIST OF PLATES AND ILLUSTRATIONS - - - - - lix–lx
GENERAL INDEX - - - - - - - - lxi–lxxxvii

DICTIONARY OF PRACTICAL MEDICINE.

INTRODUCTION, BY THE EDITOR - - - - - - 1–18
A REVIEW OF THE YEAR'S WORK IN THE TREATMENT OF DISEASE, BY MANY CONTRIBUTORS - - - - - - - - 19–508

MISCELLANEOUS.

EDITOR'S TABLE—NEW INVENTIONS AND PREPARATIONS - - - 509–31
BOOKS OF THE YEAR - - - - - - - - 532–43
ESTABLISHMENTS FOR THE TREATMENT OF MENTAL DISEASES - - 544–50
INSTITUTIONS UNDER THE MENTAL DEFICIENCY ACT, 1913 - - - 551–3
INSTITUTIONS FOR INEBRIATES - - - - - - - 554
SANATORIA FOR CONSUMPTION AND OTHER FORMS OF TUBERCULOSIS - 554–7
HYDROPATHIC ESTABLISHMENTS - - - - - - 557–8
NURSING INSTITUTIONS AND HOMES - - - - - - 558–9
PRINCIPAL BRITISH SPAS - - - - - - - 559–63
OFFICIAL DIRECTORY - - - - - - - - 564–5
EDUCATIONAL VACCINATION STATIONS - - - - - - 566
MEDICAL AND SCIENTIFIC SOCIETIES, AND PERIODICALS - - - 567–70
MEDICAL TRADES DIRECTORY - - - - - - - 570–3
PRIVATE NOTES AND ADDRESSES, AND CALENDAR - - - - 574–80
INDEX TO ADVERTISEMENTS - - - - - - - 583–96
LIFE ASSURANCE OFFICES, LIST OF - - - - - - 3–6

List of Illustrations

PLATES

PAGE

PLATES I–VI.—Barraquer's cataract operation - - - - 76-77
PLATE VII.—Cerebral tumours (*photomicrographs*) - - - - 79
PLATE VIII.—Surgery of colon - - - - - - 92
PLATE IX.—Darier's disease - - - - - - - 96
PLATE X.—Thrombosis of retinal vein following influenza (*coloured*) - 152
PLATE XI.—Surgery of the gall-bladder, Skillern's method - - - 173
PLATE XII.—Human glanders (*coloured*) - - - - - 188
PLATE XIII.—Femoral hernia, Skillern's operation - - - - 207
PLATES XIV–XXI.—Hydrocephalus - - - - - - 214–217
PLATE XXII.—Angioma of larynx - - - - - - 246
PLATE XXIII.—Chorditis fibrinosa - - - - - - 247
PLATE XXIV.—Surgical tuberculosis - - - - - - 316
PLATES XXV, XXVI.—Loose bodies in joints - - - - 326
PLATES XXVII, XXVIII.—Treatment of stiff finger-joints - - - 327
PLATES XXIX, XXX.—Operation in spreading peritonitis (Polak) - - 332–333
PLATE XXXI.—Psoriasis - - - - - - - 352
PLATE XXXII.—Spinal concussion: heteræsthesia - - - - 397
PLATE XXXIII.—Hypotonia in dementia paralytica - - - - 404
PLATE XXXIV.—Devine's operation for removal of duodenal ulcer - 416
PLATE XXXV.—Thoracic surgery - - - - - - 461
PLATES XXXVI–XXXIX.—Thyroid surgery - - - - - 466–467
PLATES XL–XLIII.—Thyroid surgery (3 *coloured*) - - - - 468–469
PLATES XLIV–XLVII.—Thyroid surgery - - - - - 470–471
PLATE XLVIII.—Thyroid surgery - - - - - - 472
PLATE XLIX.—Megasigmoid (*skiagram*) - - - - - - 502
PLATE L.—Appendix (*skiagram*) - - - - - - 503
PLATE LI.—Sacralization (*skiagrams*) - - - - - - 504
PLATE LII.—Bone radiography (*skiagrams*) - - - - - 505

ILLUSTRATIONS

FIGS. PAGE

1–4.—Excitation wave in auricular fibrillation and flutter - - 43
5, 6.—Woolston's method of applying radium in bladder tumours - 55
7.—Radium container for use in bladder tumours - - - 55
8–10.—Diagrams illustrating coagulation of blood - - - 59
11, 12.—Diagrams illustrating resistance of red blood-cells to hæmolysis - 61
13, 14.—Showing obliteration of cavity filling entire lower end of femur - 64
15.—Application of felt collar in burns of the neck - - - 67
16.—Wheeler's method for abduction and extension of the arm by a weight and pulley - - - - - - 67
17.—Protein level in pathological cerebrospinal fluids - - - 83
18.—Schematic drawing showing angulation of the lower cords of the brachial plexus over adventitious ligament - - - 85

FIGS. PAGE
19*a*, 19*b*.—Elephantiasis before and after operation 121
20.—Orifice of epispadias 146
21, 22.—Division of the rectus muscles 146
23–25.—Kleinschmidt's operation for ectopia vesicæ 148
26.—Epithelial cells of the conjunctival mucosa 155
27–32.—Operative steps in prolapse of the iris 158, 159
33.—Conservation of terminal phalanges by training the growth of granulation tissue in celluloid tubes 167
34, 35.—Method of uniting the hepatic duct with the duodenum 172
36.—Test-meal chart: normal condition 175
37.—Test-meal chart: duodenal ulcer 176
38.—Test-meal chart: reflex gastritis 177
39.—Test-meal chart: carcinoma 178
40.—Test-meal chart: achylia 179
41.—Lagrange's sclerectomy operation 191
42–44.—Veau and Ruppe's operation for hare-lip 202, 203
45.—Diaphragmatic hernia 206
46.—Relation of muscles in the inguinal region 208
47.—General plan of the vascular system of cerebrospinal fluid 214
48.—Murphy retractors in operation for bony ankylosis of the jaw 232
49.—Solid ankylosis of jaw: bone to be cut away 232
50, 51.—Charts showing 'difference value' curves in liver function tests 252
52.—Angioma involving the parotid region 279
53–55.—Operative steps in parotid fistula 280
56, 57.—Neckless man, Chambardel's case 287
58.—Pugh's frame on trolley 316
59.—Pugh's frame, showing buttock-flap, knee-bar, and pan-holder (from below) 316
60.—Cases showing late deformity after resection of the knee for tuberculosis 317
61.—Essential features of the capsule operation for recurrent dislocation of the shoulder 320
62.—Open operation for congenital dislocation of the hip 321
63.—Types of hip deformity in children compared with pseudo-coxalgia 323
64–66.—Whitman's method of reconstructing ununited fractures of the neck of the femur 324
67–70.—Septic bone cavities filled by muscle flaps 325, 326
71.—Instrument for use in pituitary surgery 337
72.—Prostatic cavity after suprapubic prostatectomy 347
73.—Exposure of bladder base and prostato-vesical opening after enucleation of the prostate 348
74.—Internal meatus after prostatectomy 348
75.—Topographical distribution of the growths in epithelioma of the skin 392
76.—Section of normal pylorus near the duodenum 407
77.—Section of hypertrophied pylorus near the duodenum 407
78–81.—Operative steps in pericardiotomy 454
82.—Extemporized air-tight drainage in empyema 456
83.—Carrel-Dakin method of disinfection in empyema 458
84.—Drainage in suppuration in the posterior mediastinum 462
85–87.—Modified Sturmdorf operation in chronic cervicitis 493, 494
88, 89.—Babcock's extraction operation for varicose veins 496
90–143.—Illustrating recent medical and surgical appliances 513–531

General Index:

The more important articles are in heavy type.

PAGE
ABDOMINAL cancer, frequency 72
— — relation to acids 69
— distention (*see* Stomach, Acute Dilatation of)
— lesions and congenital syphilis .. 444
— — simulated by influenza 226
— operations in general prolapse deprecated 187
— surgery (*see* Appendix; Colon; Gall-Bladder; Hernia; Intestine, Small; Pancreas; Peritonitis; Spleen; Stomach)
Abdominoperineal *v.* perineal incision in cancer of rectum 307
Abortion 19
— and pre-natal death 342
— septic, treatment of 19
Abortive treatment of syphilis 426
Abscess, cerebral, complicating otitis media 115
— cutaneous, in typhoid fever 484
— de-ethylized alcohol in 19
— of fixation in eye affections 162
— liver and amœbic hepatitis 23
— — due to paratyphoid fever 331
— lung, treatment 461
— — *x*-ray diagnosis 66, 506
— perinephritic, of non-renal origin .. 237
— — post-vaccinal 485
— of the prostate 349
— renal, post-vaccinal 485
— of the right frontal lobe due to measles 262
Acetone in the breath, method of estimating 20
— urine, how determined 491
Achlorhydria in diagnosis 180
Achylia gastrica in pernicious anæmia 334, 335
— test meal chart of 179
Acid media and cancer 69
Acidosis of cerebrospinal fluid in cerebrospinal fever 81
— diabetic 103
— in relation to anæsthetics 28
Acne, differentiation from rosacea, summary 375
Acne rosacea 20
— — cehasol in 387
— sulphur injections in 387
Acne vulgaris 20
— — diet in 20
— — *x* rays in 20
Acriflavine in gonorrhœa 193
Acrodynia 21
— relation to influenza and encephalitis lethargica 21
Acupuncture, galvanic, in sciatica 119
Acute dilatation of the stomach (*see* Stomach)
Adaptation in the realm of psychology .. 357
Addison's disease 134
— — and congenital syphilis 444
Adenitis, diagnostic importance in herpes zoster 210
— treatment by foreign protein 303
— tuberculous, *x*-rays in 365
Adenoids in enuresis of children 492
— hypertrophied, *x* rays in 366
— removal of, in acute otitis media .. 113
— — cervical adenitis 254
— — nasal sinusitis 285

PAGE
Adenoids, *x*-ray therapy in 366, 472
Adhesions, fibrous, round joints, faradic current in 119
— in phthisis, cauterization in 479
Adrenal glands and congenital syphilis .. 444
— — extirpation of, in epilepsy 145
— — and fevers 126
— — function of 134
Adrenalin chloride in snow blindness .. 158
— in choleriform diarrhœa 111
— conjunctivitis 154
— deficiency causing sensitive skin 117
— in gas gangrene 484
— hæmorrhoids 201
— injected into the heart in apparent death 27
— potassium sulphate, and novocain in eye affections 162
— in trachoma 474
Adventitious ligaments simulating cervical ribs 85
Advertisements, index to 583
Agar-agar in cæcal constipation 95
— palatinoids for softening fæces 509
Air-tight drainage in empyema 457
Alastrim (*see* Small-pox)
Albuminuria and congenital syphilis .. 445
— due to silver-salvarsan 425
— from injections of stovaine or novocain 30
— in pregnancy 342
— skin diseases 391
— small-pox 395
Albuminuric retinitis after antityphoid inoculation 485
— — milk injections in 164
Alcohol, de-ethylized, in abscesses 19
— and eye affections 160
— lotion in eczema 118
— massage in choleriform diarrhœa .. 112
— and mental disease 271
— solution in hæmorrhoids 201
— vapour cauterization for corneal ulcers 96
Alcoholic extract injections in rhus dermatitis 374
Aldehyde substances in the blood 57
Alkali reserve in influenza 227
Alkalinity retarding cancer growths .. 69
Alkalis in eczematoid dermatitis 99
— in infective jaundice 231
'Allergy' in skin sensitization 389
Almond oil, etc., in varicose ulcer 497
Alopecia areata 22
— — oral sepsis in 22
— sulphur injections in 387
Alum acetate in eczematoid dermatitis .. 98
Ambulatory treatment for varicose ulcer .. 496
Ammoniated mercury ointment in eczematoid dermatitis 98
Ammonium hippurate in hyperpiesis of war 39
Amœbiasis 22
Amœbic hepatitis and liver abscess 23
Amputations 24
— in common use 25
— site in relation to limb-makers 24
— in snake-bite 396
— stumps, 'spontaneous,' ulcer formation on 25

PAGE
Anæmia, acute plastic, due to *x* rays .. 363
— and congenital syphilis .. 444
Anæmia, ferrous sulphate and reduced iron in .. 25
— in juvenile tuberculosis .. 476
— pernicious (*see* Pernicious Anæmia)
— splenic, splenectomy in .. 398
Anæmias of syphilis .. 434
Anæsthesia causing dilatation of stomach .. 405
— intratracheal, by the nasal route .. 29
— local, in bronchial fistulæ .. 460
— — eye operations .. 162
— oil-ether rectal .. 30
— in thyroid surgery .. 471
Anæsthetics .. 26
— accidental explosion of ether vapour .. 28
— carbon dioxide administration after .. 27
— cardiac massage in shocked patients .. 26
— in dental operations .. 28
— 'ethanesal' .. 27
— injections into heart in shocked patients 27
— local, absorption by genito-urinary organs 237
— — forms of analgesia .. 29
— post-operative morbidity .. 28
Anal eczema, choleval in .. 387
— papillæ, hypertrophied, causing pruritus ani .. 350
Analgesia, local, saligenin in .. 31
— spinal .. 30
— splanchnic .. 30
— synergistic colonic .. 29
Anaphylactic shock, suprarenal extract in .. 389
Anaphylaxis .. 32
— peptone in .. 32
'Anergy' in skin sensitization .. 389
Aneurysm .. 32
— aortic .. 32, 467
— arteriovenous, diagnosis .. 497
— of hepatic artery .. 33
— splenic artery .. 33
Angina pectoris .. 33
— — caffeine and diuretin in .. 34
— — nervous system in causation .. 33
— — reduced blood-pressure in .. 33
— — surgical treatment .. 34
— Vincent's, in leukæmia .. 250
Angioma of the larynx .. 247
Angiomata, calcification in, *x*-ray diagnosis 507
Angiomatosis, capillary, of parotid gland .. 279
Ankylosis, bony, of jaw (*see* Jaw)
Ankylostomiasis .. 34
— treatment by oil of chenopodium .. 34
Aniline colours in gonorrhœal ophthalmia .. 163
— dyes, relation to bladder growths .. 52
Anthrax, serum therapy in .. 509
— in shaving-brushes .. 222
Anti-anthrax serum for men and animals .. 509
Anti-gas-gangrene serum, use of .. 484
Antigen, non-specific, in bacillary dysentery 110
Antigonococcic serum in gonorrhœal ophthalmia .. 162
Antimony, colloidal, in gangosa .. 173
— — schistosomiasis .. 379
— in filariasis .. 165
— leprosy .. 248
Antispasmodic, benzyl benzoate as .. 510
Antistreptococcic serum and antityphoid vaccine in bubo .. 85
Antitetanic serum intrathecally, success of 451
Antitoxin, diphtheria, administration by mouth condemned .. 107
— therapy in tetanus .. 451
Anti-tuberculosis pill .. 512
Antityphoid injections causing chorioretinitis 154
— — complications following .. 485
— — followed by herpes of the cornea .. 96
— — and antistreptococcic serum in bubo 85
Antuitrin in disturbances of metabolism .. 509
Anuria, calculous, catheterization in .. 489
Aorta in syphilitics .. 433, 442

PAGE
Aortic aneurysm .. 32
— — and dyspnœa .. 467
— regurgitation, pregnancy in .. 205
Aortitis, syphilitic, treated surgically .. 34
Aperients in acne vulgaris .. 20
'Aphytria retinæ' due to scarlatina .. 371
Appendectomy, various incisions .. 73
Appendicitis, chronic, and cæcal constipation 94
— complications and sequelæ .. 37
— fasting during early treatment .. 36
— lack of cellulose in diet as cause .. 35
— the Ochsner treatment .. 35
— simulated by ascariasis .. 41
— — influenza .. 226
Appendix, amœbic ulceration of .. 23
— employed in urethral surgery .. 491
Appendix, surgery of .. 35
— *x*-ray diagnosis .. 501
Aqueduct of Sylvius, strictures causing hydrocephalus .. 216
Aqueous glycerol and ferric chloride in rhus dermatitis .. 374
Arachnoidal cells and their relation to endothelioma formation .. 79
'Argochrom' in gonorrhœal rheumatism .. 196
Argyll Robertson pupil .. 38
Argyria following silver-salvarsan injections 432
Argyrol in ophthalmia neonatorum .. 156
— phlyctenular ulcers .. 96
— seminal vesiculitis .. 385
— urethritis .. 490
Army, typhoid fever in .. 482, 484
Arsenic in chorea .. 88
— enuresis of children .. 493
— hæmorrhagic sarcoma of skin .. 393
— and iron in alopecia areata .. 22
— — relapsing fever .. 370
— in lichen planus .. 252
— poisoning, and sclerodermia .. 381
Arseniuretted hydrogen, poisoning by .. 339
Arsenobenzol (*see* Salvarsan)
'Arsenoxide', toxic effects of .. 431
Arsphenamine (*see* Salvarsan)
Arterial tension, high (*see also* Blood-pressure) .. 38
— — — psychical element in .. 39
— — — radium in .. 39
— — — restricted protein diet in .. 39
— — in normal individuals .. 38
Arteriosclerosis .. 40
— bacterial intoxication in etiology .. 40
— bowel lavage in .. 40
— and eye affections .. 150
— sugar injections in .. 164
Arteriovenous aneurysm, diagnosis .. 497
Arthigon in gonorrhœal rheumatism .. 196
Arthritis cured by drainage of seminal vessicles .. 384
— deformans and eye affections .. 151
— gonococcal, benefited by typhoid vaccine 305
— phytin in .. 512
— rheumatic, seminal vesicles in .. 385
— rheumatoid, and influenzal vaccines 301, 305
— — due to absence of lime in the cell wall 373
— scarlatinal, followed by spontaneous dislocation of the hip .. 377
Arthrodesis deprecated in young children 319
Artificial eyes, care of .. 161
— light in industrial health .. 218
— limbs, site of amputation in relation to 24
— pneumothorax apparatus .. 522
— — in phthisis .. 479
Ascariasis .. 40
— life history of bacillus .. 40
— pathological effects .. 41
— relation to pneumonia .. 41
Ascites, posture in diagnosis .. 41
Asiatic pill in lichen planus .. 252
Aspiration and emetine method in liver abscess .. 24

PAGE
Aspiration in empyema 455, 456
Aspirin in iritis 158
Asthma, antuitrin in 509
— benzyl benzoate in 510
Asthma, bronchial 42
— — endocrine dysfunction and 42
— — heredity as a predisposing cause .. 42
— — and protein sensitization 42
— and dyspnœa 467
— eosinophilia in 400
— peptone injections in 303
— sputum in 400
— various chemical reactions causing .. 303
— Witte's peptone in 304
Astragalectomy, necessity for after-care in 319
Atresia of the œsophagus, x-ray diagnosis.. 499
Atropine in epidemic hiccough 111
Aural and laryngeal complications of typhus 487
Auricular fibrillation 42
— — bar to pregnancy 205
— — 'circus movement' in .. 42, 45
— — digitalis in 45
— — diagnosis and prognosis 44
— — quinidine in 45
— flutter, 'circus movement' in .. 42, 44
Auto-agglutinogen and red blood-corpuscles 58
Autogenous transplantations in nerve surgery 295
— vaccines in hay fever 204
— — typhoid fever 482
Autopsy findings in typhoid carrier .. 482
Autosuggestion as a cure for neuroses .. 360
Axillæ and shoulders, treatment of burns .. 67

BABCOCK'S operation for varicose veins 495
Bacillary dysentery (*see* Dysentery)
Bacilluria (*see* Coli Bacilluria)
Bacterial proteins for cutaneous tests .. 312
Bacteriology of amœbiasis 22
— ascariasis 40
— bacillary dysentery 109
— cerebrospinal fever 80, 480
— dengue 98
— diphtheria 105
— epidemic jaundice 231
— gonorrhœa 192
— impetigo contagiosa 218
— influenza 224
— kala-azar 233
— malaria 256
— plague 337
— relapsing fever 370
— schistosomiasis 378
— the throat 462
— typhoid fever 481
— typhus fever 486
— yellow fever 508
Bacteriuria in paratyphoid fever 331
Balanoposthitis, ulcerative and gangrenous 168
Balantidiosis 46
Ball's operation for pruritus ani 351
Ballooning of fornix in trachoma 474
Balmosa in muscular rheumatism 509
Barraquer's cataract operation 76
Basal metabolism, study of 127
Baths, electrical, in chorea 89
— electric-light, in Buerger's disease .. 463
— hot and mustard, in choleriform diarrhœa 112
— hot-air, in Buerger's disease 463
— and packs for infantile dyspepsia of nervous origin 111
— warm or electric, in hyperpiesis 39
'Bat-wing' deformity from burns, prevention of 67
Bazin's disease and congenital syphilis .. 444
Bed-frame, surgical, improved pattern .. 513
Bed-sores, choleval in 387
Belladonna-berry poisoning in public park 379
— in enuresis of children 493
Belladonna in epidemic hiccough 211
Belt, hypogastric, for corpulence, etc. .. 514
Benzaldehyde in whooping-cough 498
Benzoin precipitation test for cerebrospinal fluid 84
Benzyl benzoate in balantidiosis 46
— — capsules as antispasmodic 510
— — emulsion as a sedative and antispasmodic 510
— — whooping-cough 498
Biborate of soda, etc, in varicose ulcer .. 497
Bicarbonate of soda (*see* Sodium Bicarbonate)
Bichloride of mercury for tuberculous bladder 49
Bile in duodenal analysis 108
Bile-ducts, pressure in, measured 171
Bile-salts in cœliac disease 89, 90
Bilharziasis, oscol stibium in 512
— (*see also* Schistosomiasis)
Biliary obstruction due to pancreatitis .. 170
Bilirubin in the blood 57
— causing yellow cerebrospinal fluid .. 84
Billroth's operations in stomach surgery 413, 417
B.I.P.P. after mastoid operation 113
Birth-rate, relation to pre-natal death .. 342
Bismuth carbonate in oxyuris vermicularis 328
— injections in bronchiectasis 66
— in syphilis 425
Blackwater fever 46
— — and jaundice 46
— — malarial origin of 46
— — quinine in 46
— — vitex peduncularis in 47
Bladder, diseases of 47
— contracture of neck of 51
— diverticulum 48
— exstrophy of (*see* Ectopia Vesicæ)
Bladder, growths of 52
— — importance of cystoscopy 53
— — incidence in aniline workers 52
— — instrument for application of radium 54
— — involving lower end of ureter .. 54
— — papilloma 54
— — surgical treatment 53
— — value of radium treatment 55
— — x rays in diagnosis 54
— hernia 47
— involved in typhus fever 238
— leukoplakia 50
— — retention with enlarged prostate .. 51
— suprapubic drainage in 52
— treatment of, in paraplegics 51
— tuberculosis of 49
— ulcer 49
— urinary calculus 48
— — incontinence 47
— — — electrical methods in 47
— vesico-intestinal fistula 50
Blastomycotic meningitis 263
Bleeding in cavernous sinus thrombosis .. 115
— nitrobenzol poisoning 339
— (*see also* Venesection)
Blindness due to methyl alcohol poisoning.. 339
— night, liver medication in.. 164
— snow, treatment 158
Blood, aldehyde substances in 57
Blood, bacteriology of 56
— bilirubin in 57
— of cancer patients 72
Blood, chemistry of 56
— — auto-agglutinogen 58
— — in pernicious anæmia 335
Blood, coagulation time of .. 58
— — — diseases concerned 60
— — — three essential factors in 59
— collecting needle 521
— complex substances in 58
Blood, cytology of 60
— 'cytophilias' in 58
— dark-ground illumination 61
— dyscrasias, splenectomy in 398

PAGE
Blood, effect of ether on alkali reserve of .. 29
— enumeration of red cells .. 60
— eosinophilia .. 62
— examination in disorders of pregnancy .. 342
— — influenza .. 227
— — kala azar .. 233
— — for urea .. 235
— findings in multiple xanthoma .. 499
— glandular fever .. 189
— glucose in .. 57
— lipoid constituents in .. 57
— picture after antisyphilitic remedies .. 431
Blood platelets .. 63
— pressure (*see also* Arterial Tension, High)
— — action of electrical treatment on .. 119
— — and anæsthetics .. 28
— — in angina pectoris .. 33
— — and congenital syphilis .. 444
— — pressure in eye affections .. 150
— — Graves' disease .. 131
— — high, and sinistrality .. 386
— — increased, ecchymosis due to .. 117
— — normal .. 38
— — in phthisis .. 477
— — raised by camphor .. 338
— — in retention due to prostatic obstruction .. 344
— qualitative cytology of .. 62
— residual nitrogen in .. 58
— resistance of red cells .. 60
— reticulated red cells .. 61
— sedimentation of corpuscles .. 60
— serum, indican and urea content .. 237
— size of red cells .. 61
— sugar in .. 57
— — and diabetes mellitus .. 99
— — hepatic derangements .. 253
— — hyperthyroidism .. 129
— transfusion in nitrobenzol poisoning .. 339
— — pernicious anæmia .. 335
— — ulcerative endocarditis .. 122
— — in varicella .. 86
— volume in pernicious anæmia .. 334
Body temperature in chronic rheumatism .. 373
— — gout .. 374
Boils, ethyl chloride in .. 387
Bone cavities, septic .. 64
— — — methods of closing .. 64, 327
— cysts, x-ray diagnosis .. 505
— lesions and congenital syphilis .. 444
— — diathermy in .. 120
— — x-ray diagnosis .. 503
— of Vesalius, abnormal ossification at .. 505
Bone-grafting in Kuemmel's disease .. 397
Bones of foot, supernumerary .. 505
— and joints, tuberculosis in, x-ray diagnosis .. 503
Bony ankylosis of the jaw (*see* Jaw)
Books of the year .. 532
Borax poisoning .. 340
Boric acid in Darier's disease .. 96
— — phlyctenular ulcers .. 96
— ointment for ulcer of leg .. 488
Bory's iodoformized xylol in chancroid .. 85
Bowel lavage in arteriosclerosis .. 40
Braces in infantile paralysis .. 222
Brain abscess complicating otitis media .. 115
— surgery of .. 295
— tumours (*see* Cerebral Tumours)
Breast, cancer of .. 64
— — lines of advance in .. 64
— — radium and x-ray treatment 65, 362
— — treatment of recurrence .. 387
— eczema of, choleval in .. 387
— tumour of, associated with laryngeal paralysis .. 245
Breast-fed infants, immunity to measles .. 262
— — and typhoid fever .. 483
Breath, acetone in, method of estimating .. 20
Bright's disease (*see* Nephritis)

PAGE
Brilliant green in erysipelas .. 148
Broca's method of closing septic bone cavities .. 327
Bromide of sodium in eczematoid dermatitis 99
Bromides in alopecia areata .. 22
— in chorea .. 88
— diabetes .. 101
— epidemic hiccough .. 211
— hyperpiesis of war .. 39
— infantile dyspepsia of nervous origin .. 111
Bronchi, foreign bodies in .. 140
Bronchial asthma (*see* Asthma)
— fistulæ .. 460
Bronchiectasis .. 66
— and bronchitis associated with accessory sinus disease .. 284
— x-ray diagnosis in .. 66, 506
Bronchitis complicating infantile typhoid .. 483
Bronchopleural fistula, oxygen in .. 457
Bronchopneumonia and ascariasis .. 41
— complicating infantile typhoid .. 483
— influenzal, treatment .. 228
Bronchoscopic tube combined with forceps .. 141
Bronchoscopy .. 140
Bronze diabetes .. 100
Brünings' bronchoscope improved .. 141
Bubo, treatment .. 85
Bubonocele, no indication for operation .. 448
Bucky diaphragm in x-ray apparatus .. 503
Buerger's disease (*see* Thrombo-angiitis obliterans)
Bullets in lung, removal of .. 456
Burns .. 66
— abduction and extension in .. 67
— choleval in .. 387
— classification of .. 68
— prevention of contracture .. 68
— skin-grafting in .. 68
— surgical treatment .. 68
Buttermilk and lactose in dyspeptic disorders of the young .. 111
Byno-plasma in erythrœdema .. 150
Byrne's mercurialized serum in neurosyphilis 439

CÆCAL constipation (*see* Constipation, Cæcal)
Cæcosigmoidostomy in cæcal constipation .. 95
Caffeine and diuretin in angina pectoris .. 34
— in choleriform diarrhœa .. 111
Calcification in angiomata, x-ray diagnosis .. 507
Calcium carbonate in spine .. 399
— in coagulation of the blood .. 59
— lactate elixir for the blood .. 510
— — in sprue .. 399
Calculus, ureteric, methods of removal .. 489
— — and renal .. 242
— urinary .. 48
— vesical, in a typhoid carrier .. 331
Calomel in oil for tuberculous bladder .. 49
— powdered, for phlyctenular ulcers .. 96
Calvé's disease .. 322
Camphor in cardiac weakness .. 488
— choreiform diarrhœa .. 111
— effect on heart and blood-pressure .. 338
— epidemic hiccough .. 211
— and guaiacol in bubo .. 85
— in pneumonia .. 338
Camphorated oil in hæmoptysis .. 479
Cancer .. 69
— abdominal, frequency of .. 72
— — relation to acids .. 69
— of the breast (*see* Breast)
— cervix, radium in .. 493
Cancer, clinical pathology of .. 72
— of the colon, treatment .. 92
— face .. 281
— lips .. 281
— need for early diagnosis .. 71
— a parasitic disease ? .. 72

PAGE
Cancer of the pelvis of the kidney .. 241
— prostate 348
— radium and x-ray treatment .. 70, 362
— of rectum (*see* Rectum)
— relation to hot drinks 69, 70
— — intestinal stasis 70
— of skin (*see* Skin)
— of stomach 409
— and syphilis, relation to leukoplakia .. 281
— of tongue 281
— uterus, combined x rays and radium in 363
— x-ray therapy in, improved technique .. 362
Candles, germ-proof filtering.. 516
Canthoplasty for keratoconus 96
Capillary angiomatosis of parotid gland .. 279
Capsulotomy for cataract 76
Caramose in diabetes 103
Carbilamine test for acetone in the urine .. 491
Carbohydrate assimilation in diabetes .. 99
Carbolic acid in alopecia areata 22
— — etc., compresses in keloids and cicatrices 233
— — and glycerin in hæmorrhoids .. 201
— — in leprosy 248
— — psoriasis 351
Carbon arc lamp and x rays in tuberculous adenitis 365
— dioxide after anæsthesia 27
— — snow in telangiectasis.. 165
— disulphide in seborrhœa 383
— monoxide poisoning 340
Carbonate of potash and sulphur in scabies 376
— of soda in dyspeptic disorders of the young 111
Carbuncle 73
— ethyl chloride in 387
— indications for excision 74
— poultices in 74
— two types 73
Carcinoma of the choroid, x rays in .. 154
— gall bladder, symptoms 170
— larynx 246
— pharynx, x rays in 246
— stomach, test-meal chart of 178
Cardiac disease (*see* Heart)
Carotid artery, dangers of ligature 497
Carrel-Dakin disinfection in empyema 457, 458
Carriers of diphtheria treated by mercurochrome 107
— — treatment 107, 223
— typhoid, autopsy of 482
— — surgical treatment 486
— — vesical calculus in 331
Casein curds in infants' stools 221
Caseosan in ophthalmia neonatorum .. 196
Casseroles as a source of lead poisoning .. 341
Castor oil in cæcal constipation 95
Castration in atrophied testicle 448
— tuberculous epididymitis 449
Cat as an etiological factor in diphtheria .. 104
Cataract 74
— black 74
— in industrial workers 74
— operative treatment, capsulotomy .. 76
— — — delirium after 77
— — — early escape of vitreous 77
— — — in glaucomatous patients.. .. 75
— — — phakoerisis 76
— — — use of novocain 75
— post-operative infection 77
— radium in 75
Catarrhal cholangitis, symptoms 169
Cat-hair protein in hay fever.. 203
Catheter, Browdy's solid-ended 514
— holder, Hobbs's design 515
Catheterization, duodenal 108
—for ureteric calculus 489
Causalgia, operative treatment 293
Cauterization of adhesions in phthisis .. 479
— in bronchial fistulæ 460
Cauterization in corneal ulcers 96
— electric, for phlyctenular ulcers 96
— in tuberculous epididymitis 449
Cavities, osteomyelitic, treatment .. 64, 327
Cavernous sinus thrombosis 115
Cehasol in skin diseases 387
Cellular theory of skin sensitization .. 388
Celluloid in finger injuries 166
Cellulose diet in relation to appendicitis .. 35
Censor, criticism of the term 355
Cerebellar hypertrophy causing epilepsy .. 144
— or tonic fits 404
Cerebellum controlling static motility .. 401
— and muscle tonus 404
Cerebral abscess complicating otitis media 115
— cortex, disturbances following injury .. 385
— surgery 295
Cerebral tumours 78
— — arachnoidal cells and their relation to endothelioma formation .. 79
— — classification of 296
— — convulsions in 143
— — and epilepsy 142
— — and Fröhlich's syndrome 78
— — of the hypophyseal duct 78
Cerebrospinal fever 80
— — acidosis of cerebrospinal fluid in .. 81
— — bacteriology of 80
— — complications 81
— — and hydrocephalus 80
— — in infants 80
— — iodine and honey in 82
— — in old age 80
Cerebrospinal fluid 83
— — acidosis of 81
— — benzoin precipitation test 84
— — circulation, studies in 297
— — cholesterol content 83
— — in congenital syphilis 447
— — diphtheritic paralysis 106
— — disseminated sclerosis.. 282
— — hydrocephalus 212, 216
— — pressure estimated 83
— — protein content 83
— — syphilis 437
— — yellow colour 84
— syphilis 438
Cervical adenitis, tonsillectomy in 254
— glands and congenital syphilis 444
— leucorrhœa, treatment 493
Cervical ribs 84
— — adventitious ligaments simulating .. 85
Cervix, cancer of, radium in 493
Chancre, soft, pepsin. hydrochloric acid, and phenol compresses 233
Chancroid 85
— suppurating, electrargol in 85
Chaulmoogra oil in leprosy 248
'Cheiropompholyx', mycotic origin of .. 110
Chenopodium, oil of, in ankylostomiasis .. 34
Chest, surgery of (*see* Thoracic Surgery)
Chicken-pox 86
— anomalous and complicated 86
— associated with herpes 87
— inoculation for 86
— internal bleeding in 86
— relation to Kaffir-pox 395
— second attack 86
— simulated by small-pox 482
Chilblains, cehasol in 387
Child welfare, dental clinics advocated .. 260
— — milk assistance scheme 260
Children, dyspeptic disorders in (*see* Dyspeptic Disorders)
— influenza of 227
— incontinence of urine in (*see* Urine)
— pyelitis in (*see* Pyelitis)
— syphilis of, treatment 445
— thyroid surgery for 468
— tuberculosis in 476

PAGE
Chloral in chorea .. 88
— hydrate gargling in influenza .. 228
— for infantile dyspepsia of nervous origin 111
Chlorates in snake-bite .. 396
Chloretine per rectum in tetanus .. 451
Chlorides in urine, how determined .. 491
— and water test for kidney function .. 234
Choked disc and optic neuritis, diagnosis 157
Cholangitis, chronic catarrhal, symptoms .. 169
Cholecystgastrostomy in surgery of gall-bladder .. 171
Cholecystitis, acute and chronic, symptoms 169
— condition of bile in .. 108
— simulated by influenza .. 226
Cholecystosis, remittent, symptoms .. 170
Choledochitis, acute infectious, symptoms .. 169
Cholera .. 87
— kaolin in .. 87
— sanitary precautions .. 87
Choleriform diarrhœa in the young .. 111
Cholesterin added to sulphur injections .. 387
Cholesterol in blood in relation to multiplex xanthoma .. 499
— content of cerebrospinal fluid .. 83
— and heart extract in Wassermann reaction 511
Choleval bougies in gonorrhœa .. 198
— in skin diseases .. 387
Chorditis fibrinosa .. 247
Chorea .. 88
— geographical and social distribution .. 88
— relationship to rheumatism .. 88
Chorioretinitis following antityphoid injections .. 154
Choroid, carcinoma of, *x* rays in .. 154
Chromic acid bead in telangiectasis .. 165
Chrysarobin in psoriasis .. 351, 387
Chylorrhœa, delayed onset of .. 255
Cicatrices and keloids, softening of .. 233
Cignolin in psoriasis .. 351
Cinema as cause of eye-strain .. 156
Circulatory disturbances in goitre .. 468
'Circus movement' in auricular fibrillation 42, 45
— — — flutter .. 42, 44
Cirrhosis of the liver and syphilis .. 434
— portal, and congenital syphilis .. 444
Cisterna magna, diagnostic puncture of .. 299
Cisternæ, obstruction of, in hydrocephalus 213, 215
Clairmont operation in recurrent dislocation of shoulder .. 319
Clamp and cautery operation in hæmorrhoids 201
— penile, improved .. 521
'Clock' neuroses in insomnia .. 358
Coagulation time of blood (*see* Blood)
Coagulen-ciba for clotting the blood .. 510
Coal miner's nystagmus, a nervous disease .. 314
— — Snellen's test in .. 219
Cobra, bite of .. 396
Cocaine in epidemic hiccough .. 211
— trachoma .. 474
Cocoanut in diabetes .. 102
Codeina sedatives in diabetes .. 101
Cœliac disease .. 89
— — bile-salts in .. 89, 90
— — condition of stools in .. 89
— — fat-absorption in .. 89
— — pancreas in .. 90
Coley's fluid in cancer .. 71
Coli bacilluria .. 90
— — coli soda vaccine in .. 91
Collargol in gonorrhœa .. 194
— in seminal vesiculitis .. 384
Colles's law, case supporting .. 436
Colloidal antimony in gangosa .. 173
— — schistosomiasis .. 379
Collosal argentum in gonorrhœa .. 193
— manganese in carbuncle .. 74
Colds and mucous deficiency in throat .. 463
Colon, congenital dilatation of .. 211
— diverticulitis of, *x*-ray diagnosis .. 501

PAGE
Colon, proximal, constipation of .. 93
Colon, surgery of .. 91
— — for cancer .. 92
— — — technique .. 92
— — megacolon .. 91
Colonic analgesia, synergistic .. 29
Colour tests of urine .. 235
Colours, aniline, in gonorrhœal ophthalmia 163
Colubrine poisoning, treatment .. 396
Coma following antisyphilitic remedies .. 429
Complement-fixation test in gonorrhœa .. 192
— — phthisis .. 478
Compression fracture of spine .. 396
Compressor urethræ constructed by new operation .. 145
Concussion of spinal cord and heteræsthesia 397
Congenital dilatation of colon .. 211
— dislocation of hip, operative treatment .. 320
— — patella .. 505
— hypertrophic pyloric stenosis .. 407
— syphilis (*see* Syphilis, Congenital)
— valves of the posterior urethra .. 490
Congenitally separate tuberosity of the tarsal scaphoid .. 168
Conjunctiva and tarsus, excision of, in trachoma .. 473
Conjunctivitis, follicular, diagnosis .. 473
— peculiar form reported .. 154
— protargol in .. 474
Consciousness and the unconscious .. 353
Constipation, cæcal .. 93
— — cæcosigmoidostomy in .. 95
— — causes and pathogeny .. 94
— — — and chronic appendicitis .. 94
— — — diarrhœa in .. 94
— — — diet in .. 95
— — — malaise in .. 93
— — — nightmare in .. 94
— — *x*-ray examination in .. 93
— chronic, agar-agar palatinoids in .. 509
Convulsions in brain tumours .. 143
Copper sulphate in trachoma .. 474
Coprostasis as a cause of dementia præcox .. 266
Contracture of bladder neck .. 51
— burns, prevention of .. 66
Cornea, diseases of .. 96
— — keratoconus .. 96
— — ulcers .. 96
Corneal herpes and antityphoid inoculation 485
Corpus luteum in Graves' disease .. 133
— — ovarian headache .. 328
'Corrigan' pulse in pregnancy during aortic regurgitation .. 205
Cortical or pyramidal types of postural hypertonus .. 401
Cough in lesions of mediastinum .. 461
Cow infecting man with glanders .. 188
'Coxa plana' .. 322
Cream and egg diet in glycosuria .. 101
— tarts as a cause of paratyphoid fever .. 330
Crime in relation to mental disease .. 272
Crutch and walking-stick combined .. 529
Cutaneous abscesses in typhoid fever .. 484
— tests, value of .. 389
— — various proteins for .. 311
Cyanide gauze in tropical ulcer .. 474
— of mercury in optic atrophy .. 154
Cyst of bone, *x*-ray diagnosis .. 505
— pancreas .. 329
— spleen, splenectomy in .. 399
— thyroglossal duct .. 281
Cystitis and pyelitis, treatment .. 238
Cystoscopy, importance in bladder growths 53
'Cytophilins' in the blood .. 58

DACRYO-ADENITIS and mumps .. 284
Dacryocystitis .. 156
Dakin disinfection in chronic empyema 457, 459
Darier's disease .. 96

PAGE
Dark-ground illumination and the blood 61
Deaf-mutism 97
— residual hearing in 97
Deafness 97
— hysterical 97
— 'massaging' the membrane 98
— new uses for Politzer's tube 98
— progressive, a diagnostic sign in 97
Decerebrate rigidity type of postural hypertonus 402
Deformities and congenital syphilis 444
— of neck an indication for thyroid surgery 467
— static or postural, treatment 317
Delinquency and crime, relation to mental disease 272
Delirium after cararact operations 77
Dementia paralytica, hypotonia in 404
— præcox (*see* Mental Disease)
Dengue 98
— parasite and yellow fever 98
Dental clinics in child-welfare schemes 260
— disease and eye affections 151
— operations, anæsthesia in 28
Depilation by radium in ringworm 374
'Dermal scaling', clinical features 142
Dermatitis, from antisyphilitic remedies 429, 430
— due to arsphenamine 107
Dermatitis, infectious eczematoid 98
— rhus (*see* Rhus Dermatitis)
Desensitization to food idiosyncrasies 310
— pollen idiosyncrasies 311
Desires and wishes in current psychology 354
Detachment of retina 372
Devine's treatment for duodenal ulcer 416
Diabetes, acidosis, treatment of 103
— bronze, features of 100
— and endocrinal glands 99
— insipidus and congenital syphilis 444
Diabetes mellitus 99
— — blood-sugar in 99
— — diet in 101
— — 'hæmoclasic crisis' in 101
— — operative treatment 103
— — and the pancreas 99
— — relation to hyperthyroidism 100
— — rôle of ductless glands in 99
Diachyl ointment to remove scabs in eczema 118
Diachylon in intertrigo 228
Dial as a hypnotic 510
Diaphragm, incision of, in Duval-Barasty's operation 453
— phrenic blockage for operations near 336
Diaphragmatic hernia (*see* Hernia)
Diarrhœa in cæcal constipation 94
— choleriform, in the young 111
Diathermy in bone lesions 120
— chronic empyema 120
— tuberculous bladder 49
— whooping-cough 498
Diet in acne vulgaris 20
— alopecia areata 22
— cæcal constipation 95
— diabetes 101
— epilepsy in relation to 304
— in etiology of appendicitis 35
— for infants 219
— invalids', 'emprote' in 510
— in phlyctenular ulceration 96
— phthisis 481
— seminal vesiculitis 384
Dietetics, progress of 509
Digifoline as a substitute for digitalis 510
Digitalis in auricular fibrillation 45
— hæmoptysis 479
— heart disease during pregnancy 205
— pneumonia 338
Dilatation of the stomach, acute (*see* Stomach)
— urethra in urethritis and stricture 490
Diphtheria 104
— antitoxin in 107
Diphtheria antitoxin, direct application to trachea and bronchi 142
— — in orchitis accompanying mumps 284
— bacteriology 105
— carriers, mercurochrome in 107
— — treatment 224
— cats as an etiological factor 104
— chronic 105
— complicating typhus 487
— laryngeal, factors reducing mortality in 107
— of middle ear 106
— paralysis of accommodation in 106
— of penis 106
— relation to scarlet fever 377
— Schick test in 106, 223
Dipsomania 271
Disc, choked, and optic neuritis, differential diagnosis 157
Disinfection of cavity in empyema 548
Dislocation of hip in paratyphoid fever 331
— — congenital, operative treatment 320
— — spontaneous, after scarlatinal arthritis 377
— patella, congenital 505
— shoulder, recurrent, operative treatment 319
Disseminated myelitis, and optic neuritis 314
— sclerosis (*see* Multiple Sclerosis)
Distention of bowel after prostatectomy 345
Diuresis due to urotropine 488
Diuretin and caffeine in angina pectoris 34
Diverticulitis, duodenal, *x*-ray diagnosis 501
Diverticulum of the bladder 48
Döhle's inclusion bodies in scarlet fever 377
Douche, collapsible, for travelling, etc. 515
Douching, hot, in pelvic varicocele 332
Drainage, air-tight, in empyema 457
— of the intestine in peritonitis 333
— in pelvic infection 332
— permanent, of the only kidney 239
— suprapubic, in bladder diseases 52
— in surgery of the gall-bladder 170
Drop-bottles, eye (Luzardis) 515
— metaline 515
Dropper for Wassermann test 516
Drug eruptions 107
Dry cold in eczema 119
Ductless glands (*see* Endocrinology, etc.)
Duodenal analysis 108
— — Einhorn tube in 108
— — findings in various diseases 109
— — *x*-ray examination in 109
— diverticulitis, *x*-ray diagnosis 501
— ulcer (*see also* Gastric and Duodenal Ulcer) 183
— — chronic, gastrojejunostomy in 415
— — — symptoms 414
— — frequency compared with gastric ulcer 415
— — gastro-enterostomy in 185
— — test-meal chart of 176
— — *x* rays in diagnosis of 109
Duodenum compressed by mesentery causing dilated stomach 405
— united with hepatic duct, method 173
Dust inhalation, *x*-ray study of 506
Duval-Barasty operation, technique 452
Dysentery, amœbic 22
Dysentery, bacillary 109
— — non-specific antigen in 110
— — vaccine in 110
Dysidrosis, mycotic origin of 110
Dyspepsia in the young 110
— — choleriform diarrhœa 111
— — nervous unrest in 111
— — parenteral infection 110
— — stools in 110
Dysphagia in goitre 469
— lesions of mediastinum 461
Dyspnœa due to goitre 466
— — heart disease 467
— in lipoma of mediastinum 461
Dystrophia adiposo-genitalis in hypophyseal duct tumours 78

PAGE
EAR, middle, affections of in typhus .. 487
Ear, middle, disease of (*see also* Otitis Media).. 112
— — primary diphtheria of.. 106
Ecchymoses 116
— due to increased blood-pressure 117
— horse-shoe, of palate, in fractured jaw .. 117
Eclamptic fits 342
Ectopia testis, treatment 448
Ectopia vesicæ, Kleinschmidt's operation 148
— — new operation for 146
— — ureter transplanted into intestine .. 147
Eczema 117
— caused by drugs used in eye affections .. 163
— cehasol in 387
— choleval in 387
— failure of cutaneous tests in 389
— irritability of skin due to adrenalin deficiency 117
— local applications in 118
— protein sensitization in 117
— seborrhœic, relation to psoriasis 117, 351
Eczematoid dermatitis, infectious 98
— ringworm 374
Editor's table: progress of pharmacy, dietetics, etc., and new medical and surgical appliances 509
Educational vaccination stations 566
Egg and cream diet in glycosuria 101
Einhorn's tube in duodenal analysis .. 108
Elbow, burns of, extension in 67
Electrargol in cerebrospinal fever 82
— suppurating bubo 85
Electric bath in Buerger's disease 463
— — in chorea 89
— cautery for phlyctenular ulcers .. 96
— dilatation of urethra in stricture .. 490
— light and eye affections 153
— needle in telangiectasis 165
— tests previous to operation on nerves .. 288
— treatment in peripheral nerve injury .. 285
— — urinary incontinence 47
Electrolysis in hæmorrhoids 201
— — and hæmorrhage 120
Electrotherapeutics (*see also* X ray; Radiotherapy) 119
— diathermy 120
— electrolysis 120
— faradic current 119
— galvanic current 119
— ionization 120
— in neuritis of motor nerves 119
— ultra-violet radiation 120
Elementary schools medical inspection .. 380
Elephantiasis, Kondoléon's operation in 120
Elliot's trephining method in glaucoma .. 191
Emetine bismuth iodide in amœbiasis .. 23
— in schistosomiasis 379
Emotionalism in insomnia 358
'Emprote' in invalid diet 510
Empyema (*see also* Thoracic Surgery) .. 455
— chronic, diathermy in 120
Encephalitis lethargica and eye affections .. 152
— — hiccough in 210
— — optic neuritis in 314
— — relation to acrodynia 21
Endocarditis complicating scarlet fever .. 377
Endocarditis, ulcerative 121
— — blood transfusion in 122
Endocervicitis, treatment 493
Endocrine dysfunction and asthma.. .. 42
— glands and congenital syphilis 444
— — diabetes 99
Endocrinology (*see also* Thyroid Gland) 122
— adrenal glands 134
— co-operative effect of glands on pancreas 125
— general principles of internal secretion .. 139
— the gonads 138
— and hormones 123
— hyperthyroidism 127

PAGE
Endocrinology in hyperthyroidism, basal metabolic rate 127
— — biochemical tests for 129
— — and diabetes 100
— — Graves' disease 130
— — thyroid function tests 465
— hypothyroidism 133
— and the nervous system 124
— origin of glands 126
— parathyroid glands 133
— pineal gland 137
— pituitary gland 135
— pluriglandular syndromes 138
— thymus gland 137
— thyroid gland 127
Endopsychism, the principle of 357
Endoscopic apparatus, improved 516
Endoscopy, peroral 140
— — for foreign bodies in air- and food-passages 140
— — new instruments 141
Endothelioma formation, relation to arachnoidal cells 79
Enteric fever (*see also* Paratyphoid; Typhoid)
— — constancy of clinical manifestations.. 482
— — prophylactic inoculation 484
Enterostomy in intestinal surgery 228
Enucleation of the thyroid gland—technique 470
Enuresis of children (*see* Urine, Incontinence of)
— faradic current in 119
Eosinophilia 63
— after antisyphilitic remedies 431
— in asthma 400
— and drug eruptions 108
Epidemic hiccough (*see* Hiccough)
— jaundice (*see* Jaundice)
Epidermal proteins for cutaneous tests .. 312
— — in hay fever 203
Epidermophyton inguinale .. 142
— — Sabouraud's technique 142
Epididymectomy in tuberculous epididymitis 449
— tuberculous, treatment 449
— vaccine treatment in 194
Epididymis (*see* Testicle)
Epilepsy 142
— after antityphoid inoculation 485
— diet in etiology of 304
— effect of influenza on 227
— extirpation of the adrenal in 145
— intracranial pressure changes in.. .. 144
— and peptone injection treatment .. 304
— tumours of the temporosphenoidal lobe 143
— *x*-ray examination of the head 144
Epinephrin (*see* Adrenalin)
Epispadias.. 145
— new operation for constructing compressor urethræ 145
Epithelioma following lupus erythematosus 391
— of the lower lip 282
— nose with Darier's disease 96
— papillomatous, of the renal pelvis .. 241
— of the skin (*see* Skin)
Erb's dystrophy, pineal body and 137
Ergot as tonic to bowel muscle 345
Erisophake, use in cataract operations .. 76
Erlangen technique and malignant disease.. 362
Eruptions of the skin due to foreign proteins 390
— — — salvarsan 107, 429
Erysipelas, brilliant green in 148
— cehasol in 387
— failure of vaccine therapy 148
Erythema following antisyphilitic remedies 429
Erythema, recurrent scarlatiniform 149
— due to silver-salvarsan 425
Erythrœdema 149
— insomnia in 150
— open-air treatment in 150
— shedding of nails in 150

PAGE
'Ethanesal', a new anæsthetic 27
Ether, effect on alkali reserve of the blood .. 29
— and formalin in intertrigo 228
— injections in whooping-cough 498
— inhalers 519
— in leprosy 248
— and magnesium sulphate in colonic analgesia 29
— in peritonitis 333
— vapour, accidental explosion of 28
Ethyl chloride in boils and carbuncles .. 387
Ethylhydrocuprein in eye infections .. 162
Eucalyptol added to sulphur injections .. 387
Eustachian tube catheter appliance 516
Excision, indications for, in carbuncle .. 74
— of tarsus and conjunctiva in trachoma .. 473
Exfoliative dermatitis due to arsphenamine 107
— — and treatment of syphilis .. 429, 430
Exophthalmic goitre (*see* Graves' disease)
Extirpation of the thyroid gland—technique 470
Extrapleural thoracoplasty in phthisis .. 480
Eye affections, abscess of fixation in .. 162
— — and alcohol 160
— — arteriosclerosis 150
— — arthritis deformans 151
Eye affections associated with disease of other organs .. 150
— — chorioretinitis 154
— — cinemas causing strain 156
— — conjunctivitis 154
— — dacryocystitis 156
— — and dental disease 151
— — detachment of choroid 154
— — and electric light 153
— — encephalitis lethargica 152
Eye affections, general (*see also* Cataract; Cornea; Glaucoma; Ophthalmology, Preventive; Retina: Trachoma) 152
— — and Graves' disease 153
— — heterophoria in presbyopic patients 158
— — influence of age on 157
— — and influenza 152
— — local anæsthesia in 162
— — methyl alcohol causing blindness .. 339
— — and meningitis 152
— — miners' nystagmus 219, 314
— — nasal sinus disease 152
— — neurological aspect 153
— — night blindness, liver medication in 163
— — ophthalmia neonatorum 155
— — optic neuritis and papillœdema .. 157
— — pituitary tumour 153
— — prolapsed iris 158
— — quinine amblyopia 160
— — shifting as an aid to vision 157
— — snow blindness 158
— — sugar injections in 164
— — sympathetic ophthalmia 160
— — tobacco as a cause of 160
— — x-ray examination in.. 151
Eye, general therapeutics of .. 162
— — — gonorrhœal ophthalmia 162
— — — idiosyncrasies as regards drugs .. 163
— tuberculosis of, milk injections in .. 164
Eyes, artificial, care of 161
— effect of x rays on 96

FACE, surgery of (*see* Mouth and Face)
— tumours of 278
Fæces in cœliac disease 89
— in dyspeptic disorders of infants .. 110
— of pernicious anæmia patients .. 335
— in relation to infant feeding 220
— softened by agar-agar palatinoids .. 509
— in typhoid fever 481
Fairley's antigen test in schistosomiasis .. 378
Familial hæmorrhages in skin and mucosæ 16

PAGE
Familial tabes dorsalis 447
Faradic current in enuresis 119
— — fibrous adhesions round joints .. 119
Faradism in chorea 89
Fat absorption in cœliac disease 89
— content of stools in cœliac disease .. 89
— in diet of diabetics 101
Fat-splitting in cœliac disease 90
Feet, eczema of, choleval in 387
Feminism in Graves' disease.. 131
— resulting from orchitis with mumps .. 284
Femoral hernia, new method of closing canal 207
Femur, condition of, in pseudo-coxalgia .. 322
— ununited fractures of neck 324
Ferments, testing for, in gastric analysis .. 177
Ferric chloride in aqueous glycerol in rhus dermatitis 374
Ferrous phosphate administered in bi-palatinoid form 510
— sulphate and reduced iron in anæmia .. 25
Ferruginous syrup, a substitute for Parrish's food 510
Fibrillation (*see* Auricular Fibrillation)
Fibrinogen in coagulation of the blood .. 59
Fibrinous laryngitis 247
Fibrositis, peptone injections in 305
Fibrous adhesions round joints, electricity in 119
Filaria medinensis, tartar emetic in 166
Filariasis 165
— tartar emetic in 165
Filtering candles, germ-proof 516
Finger-joints, stiff, treatment 327
Fingers, injuries of, celluloid in .. 166
— sensory disturbances of cortical origin .. 385
— and wrist, treatment of burns 67
Fistula, bronchopleural, oxygen in 457
— urethrorectal, Young-Stone operation in 491
— vesico intestinal 50
Fistulæ, bronchial 460
Fits following antisyphilitic remedies .. 429
— tonic 404
Fixation abscess in eye affections 162
— in Kuemmel's disease 397
Flat-foot, treatment 318
Flavine in carbuncle 73
Flexner dysentery bacilli 109
Flutter, auricular (*see* Auricular Flutter)
Focal infections, alopecia due to 22
Fœtal deaths due to syphilis.. 435
— measurements to establish maturity of child 244
— syphilis, x-ray diagnosis 505
Fœtus in utero, effect of x rays on 366
Follicles in trachoma 473
Follicular conjunctivitis, diagnosis 473
— keratosis 96
Food and food control 167
— idiosyncrasies, desensitization to .. 310
— proteins for cutaneous tests 311
— sensitization (*see* Non-specific Protein Therapy)
— transport regulations 167
Foot, paralytic deformities of 319
— supernumerary bones of 505
Foot, surgery of 168
Foramina of Magendie and Luschka, occlusion of, in hydrocephalus 215
Forceps, sterilizer, new patterns 523
— tracheotomy 527
Fordyce's disease, age incidence 168
Foreign bodies in larynx, trachea, etc. .. 140
— — œsophagus and stomach 141
— proteins (*see* Non-specific Protein Therapy)
Formalin and ether in intertrigo 228
Fornix, ballooning of, in trachoma 474
Fourth venereal disease 168
Fracture of femur, ununited 324
— spine, compression 396
Fractures, ecchymosis a diagnostic sign in.. 116
— ununited, foreign proteins in 303

PAGE
‘Freezing’ in phrenic blockage .. 336
— pyogenic infections .. 387
‘French’ cure in scabies .. 376
Freud’s explanation of melancholia .. 267
Fröhlich’s syndrome in hypophyseal duct tumours .. 78
Frontal sinusitis, intranasal operation in .. 285
Fruit diet in acne vulgaris .. 20
— — diabetes .. 102
Fungus, infectivity of, in ringworm .. 371
Furunculosis (*see* Boils ; Carbuncle)

GAERTNER’S bacillus and typhoid fever 484
Gall and opium in hæmorrhoids .. 201
Gall-bladder, carcinoma of, symptoms .. 170
— disease, chronic, analytical findings .. 109
— hydrops of .. 171
Gall-bladder, surgery of .. 170
— — cholecystgastrostomy .. 171
— — drainage discussed .. 170
— — hepatic duct united with duodenum 173
— — pressure in bile-ducts measured .. 171
— of typhoid carriers removed .. 486
— typhoid infection localized in .. 483
Gall-bladder and biliary passages, diagnosis of disease .. 169
Gall-stones containing typhoid bacilli .. 482
— simulated by rheumatism .. 287
— *x*-ray diagnosis .. 502
Galvanic acupuncture in sciatica .. 119
Galyl in gangosa .. 173
— tropical ulcer .. 474
Gangosa, treatment .. 173
Gangrene of the lung .. 461
— — neosalvarsan in .. 253
Gangrenous and ulcerative balanoposthitis .. 168
Gargarisma formalin co. as a gargle .. 510
Gargle, chloral hydrate, in influenza .. 228
Gas gangrene in typhoid fever .. 484
Gastric analysis .. 174
Gastrectomy, partial, Billroth’s method 413, 417
— — fractional, superseded .. 174
— — method .. 176
— — motor power of stomach .. 180
— — pathological exudations .. 182
— — secretory power of stomach .. 178
— — testing for ferments .. 177
— — test-meal charts .. 175
Gastric and duodenal ulcer, duration of treatment .. 184
— — — end-treatment statistics .. 183
— — — function of gastro-enterostomy .. 185
— — — mortality statistics .. 184
— — — perforation in .. 411
— — — pyloroplasty in .. 410
— — — treatment .. 183, 185, 410
— lavage in dilated stomach .. 406
— surgery (*see* Stomach Surgery)
— ulcer, chronic, after-treatment .. 414
— — — diagnosis .. 411
— — — treatment .. 412
— — — vomiting in .. 412
— — frequency compared with duodenal .. 415
— — and mucus deficiency .. 463
— — operative treatment .. 409
— — *x*-ray diagnosis .. 500
Gastritis, reflex, test-meal chart of .. 177
Gastro-enteritis, typhoid, in infants .. 483
Gastro-enterostomy in duodenal ulcer 185, 415
Gastro-intestinal disorders and skin disease 389
Gastrojejunal ulceration .. 416
Gastrojejunostomy in chronic duodenal ulcer 415
— *v.* pyloroplasty .. 409, 416
Gastroscopy .. 141
Gelatin in hæmatemesis .. 200
General paralysis, mercurialized serum in .. 439
Genital prolapse .. 186
— — abdominal intervention deprecated .. 187
— — end-results of vaginal operations .. 186

PAGE
Genito-urinary derangements, antuitrin in .. 509
— organs, absorption of local anæsthetics by .. 237
Germ-proof filtering candles .. 516
Glanders .. 188
— human infection from cow .. 188
Glands, endocrine (*see* Endocrinology, etc.)
— enlarged infected, compresses for .. 233
Glandular fever .. 188
— — difference from lymphoblastosis .. 250
— — and leukæmia .. 250
— — simulation of mumps or leukæmia .. 189
‘Glass-workers’’ cataract in iron-smelters .. 74
Glaucoma .. 190
— chronic hereditary .. 190
— due to homatropine .. 190
— Lagrange’s sclerectomy in .. 191
— pain in, referred to teeth .. 190
— trephining by Elliot’s method .. 191
Glaucomatous patients and cataract .. 75
Glioma of retina .. 372
Glomerular nephritis following small-pox .. 395
Glottis, œdema after antityphoid inoculation 485
— — subsequent to measles, pilocarpine in 262
Glucose in the blood .. 57
— diabetes mellitus .. 99
— solution in pneumonia .. 338
— tolerance test in hyperthyroidism .. 129
Glycerin and iodine in gonorrhœa .. 197
— rectified spirit in eczema .. 118
Glycosuria affecting operation on ureter .. 489
— and diabetes mellitus .. 100
Goetsch’s test for hyperthyroidism .. 129
Goggles, use of, to prevent eye troubles .. 313
Goitre (*see* Graves’ Disease ; Thyroid Gland, Surgery of)
Gold salts in snake-bite .. 396
Goldsol test advocated for detection of syphilis .. 270
Gonads, rôle of, in the endocrine system .. 138
Gonargin in gonorrhœal rheumatism .. 196
Gonococcal arthritis benefited by typhoid vaccine .. 305
Gonorrhœa .. 192
— abortive treatment .. 193
— complement-fixation test in .. 192
— and ophthalmia neonatorum .. 196
— rheumatism in .. 196
— secondary infection of prostate .. 195
— test of cure .. 195, 198
— vaccine therapy .. 194
— in women .. 196
— — caustic remedies deprecated .. 197
— — pregnancy in .. 197
— — test for cure .. 198
Gonorrhœal ophthalmia, serum therapy in .. 162
Gout, body temperature in .. 374
Gout and rheumatism .. 373
Grafting of skin in burns .. 68
— in surgery of peripheral nerves 292, 294
Granite industry, dust inhalation in .. 506
Granuloma inguinale, tartar emetic in .. 199
Graves’ disease .. 199
— — antuitrin in .. 509
— — cardiovascular complications in .. 130
— — and congenital syphilis .. 444
— — corpus luteum in .. 133
— — emotional origin .. 132
— — enlargement of thymus in .. 137
— — and eye affections .. 152
— — feminism in .. 131
— — and hyperthyroidism .. 130
— — improvement after local infection .. 199
— — mastoiditis with .. 200
— — measles with .. 199
— — radium in .. 133
— — removal of thymus in .. 471
— — thyroidectomy in .. 471
— — and thyroid surgery .. 468
— — tonsillitis with .. 200

PAGE
Graves' disease, x rays in 132, 366
Guaiacol and camphor in bubo 86
— for tuberculous bladder 49
Gunshot wound of the lung 458, 461

HÆMATEMESIS 200
— in gastric ulcer 412
— pressure in 200
'Hæmoclasic crisis' in diabetes 101
Hæmoglobinuria, paroxysmal, proteins in .. 303
Hæmolytic jaundice, splenectomy in .. 399
— serum, use in complement-deviation reactions 513
Hæmophilia, horse-serum injections in .. 308
Hæmoptysis, camphorated oil in 479
Hæmorrhage complicating thyroid surgery .. 471
— electrolysis in 120
— intra-ocular, prevented by venesection .. 75
— of retina, recurrent 372
— in skin and mucosæ, familial 165
— suppressed by coagulen-ciba 510
— treatment by foreign proteins 303
Hæmorrhagic course of chicken-pox .. 86
— cysts of spleen, splenectomy in 399
— multiple sarcoma of the skin 393
Hæmorrhoids, electrolysis in 120
Hæmorrhoids, internal 200
— — operative treatment 201
— — palliative treatment 200
Hair, loss of, in seborrhœa 383
Hallucinations in dementia præcox 267
Hands, eczema of, choleval in 387
Hardy's ointment in scabies—formula .. 376
Hare-lip 202
— splint for 517
Hay fever 203
— — autogenous vaccines in 204
— — epidermal protein in 203
— — heredity in 388
— — perennial, cutaneous tests in 203
— — treatment with pollen 204
Hazeline in hæmorrhoids 201
Headache, ovarian, corpus luteum in .. 328
— — relation to menses 328
Heart, condition of, in goitre 468
— direct adrenalin injections, in cases of apparent death 27
— disease and dyspnœa 467
— extract and cholesterol in Wassermann reaction 511
Heart disease, pregnancy in .. 204
— — — aortic regurgitation 205
— — — mitral stenosis 204
— — — procedure during labour 205
— — in scarlet fever 377
— failure in pneumonia 337
— massage of, in anæsthetic shock 27
— method of exposing 452
— syphilis of 442
Heliotherapy in tuberculous epididymitis 449, 450
Heliotropism in animals 122
Hemesine in snow blindness 158
Hepatic artery, aneurysm of 33
— duct united with duodenum, method .. 173
— and pancreatic insufficiency 253
Hepatitis, amœbic, and liver abscess .. 23
Hereditary deaf-mutes 97
— glaucoma, chronic 190
Heredity and bronchial asthma 42
— hay fever 388
— in mental disease 264
— nervous disease 447
— sinistrality 386
Hernia of the bladder 47
Hernia, diaphragmatic 206
— — thoracic route advocated 206
Hernia, femoral, new method of closing canal 207

PAGE
Hernia, inguinal .. .. ..
— — important points in operative technique 208
— — mechanism of strangulation 209
— — position of patient during operation .. 209
— — recurrence 207
— sliding 209
Herpes associated with chicken-pox .. 87
— of the cornea after antityphoid inoculation 96, 485
Herpes zoster 209
— — adenitis with 210
— — liver and lung affections with .. 209
Heteræsthesia due to concussion of spinal cord 397
Heterophoria in presbyopic patients .. 158
Hexamethylenamine in neurological surgery 299
Hiccough, benzyl benzoate in 510
Hiccough, epidemic 210
— — and encephalitis lethargica 210
— — medical and physical remedies .. 211
— phrenic blockage for 336
'High protein' stool of infants 221
Hip, dislocation of, congenital, operative treatment 320
— — with paratyphoid fever 331
— — spontaneous, after scarlatinal arthritis 377
— and knee, treatment of burns 68
Hippuric acid synthesis test for renal function 236
Hirschsprung's disease (*see also* Colon, Surgery of; Stomach, Surgery of) 211
— — in twins 211
— — x-ray diagnosis 501
Hodgkin's disease, skin eruptions in 211
— — splenectomy contra-indicated .. 398
Holocaine in eye causing vomiting and diarrhœa 163
Homatropine causing glaucoma 190
— instillation causing general intoxication 163
Homosexuality in mental disease 268
Honey, harmlessness, in diabetes 102
— and iodine in cerebrospinal fever .. 82
Hookworm disease (*see* Ankylostomiasis)
Hordine as a substitute for malt 511
Hormone palatinoids for men and women .. 511
Hormones and endocrinology 123
Hormonigen in neurasthenia, etc. 511
Horse-serum injections in hæmophilia .. 308
— — purpura 308
Horse-shoe ecchymosis of palate in fractured jaw 117
— kidney, nephrolithotomy in 238
Hot-air bath in Buerger's disease 463
Hot drinks in relation to cancer .. 69, 70
Hour-glass stomach (*see* Stomach, Hour-glass)
Humoral theory of skin sensitization .. 388
Hydatid bone cyst, x-ray diagnosis 505
Hydrocele, new operation for 448
Hydrocephalus 212
— and cerebrospinal fever 80
— 'communicating', cause of 212
— — produced experimentally 212
— congenital 298
— double ligature of carotid in 497
— indigo-carmine test in 216
— obstruction in the cisternæ 215
— — subarachnoid space 212
— occlusion of the foramina of Magendie and Luschka 215
— strictures of the aqueduct of Sylvius .. 216
Hydrochloric acid in acne rosacea 20
— — alopecia areata 22
— — etc., compresses in keloids and cicatrices 233
Hydrocholecystosis, symptoms 170
Hydrogen peroxide in snake-bite 396
Hydropathic establishments 357
Hydrops of gall-bladder, pathology of .. 171

PAGE
Hyoscyamus in enuresis of children 492
Hyperchlorhydria in diagnosis 180
Hyperchlorite solution in empyema 459
Hyperglycæmia 100
— etiology 57
Hyperidrosis in eczematoid ringworm 374
Hyperpiesis (*see* Arterial Tension, High; Blood-Pressure)
Hypersecretion of sebaceous glands in seborrhœic eczema 117
Hyperthyroidism (*see* Endocrinology) 127
Hypertonic salines in cholera 87
— — hæmatemesis 200
— — lowering intracranial pressure 144
Hypertonus, postural (*see* Postural Hypertonus)
Hypertrophic pyloric stenosis, congenital 407
Hypertrophied adenoids and tonsils, *x* rays in 366
— anal papillæ causing pruritus ani 350
— cerebellum causing epilepsy 141
— prostate (*see also* Prostate), contra-indicating operation on ureter 489
— — *x* rays in 366
Hypnosis in treatment of insomnia 358
Hypo-adrenalism, 'white-line' test in 134
Hypodermic needle case 519
— syringes, new patterns 517
Hypogastric belts for corpulence, etc. 514
Hypophyseal duct, tumours of 78
Hypophrenia and influenza 271
Hypopituitarism, polycythæmia in 136
Hypospadias, penile, operation for 490
Hyposulphite of soda in anaphylaxis 32
Hypothyroidism 133
Hypotonia 403
— in dementia paralytica 404
Hysterical deafness 97

ICE-BAGS in hæmoptysis 479
Immobilization in hæmoptysis 479
Impetigo Contagiosa 218
Impotence, medicaments for 509, 511
Incisions used in appendectomy 37
Incontinence of urine (*see* Urine, Incontinence)
Indican and urea content of the blood-serum 237
Indigo-carmine test in hydrocephalus 216
Industrial health 218
— — artificial light in 218
— — miners' nystagmus 219
Inebriates, institutions for 554
Infancy pyelitis in 361
Infant feeding 219
— — breast-milk in 219
— — dried milk in 220
— — in relation to stools 220
Infantile deaths due to syphilis 435
Infantile paralysis 221
— — braces in 222
— — treatment 318
Infantilism and congenital syphilis 444
Infants, breast-fed, immunity of to measles 262
— cerebrospinal fever in 80
— dyspeptic disorders in (*see* Dyspepsia)
— and pregnant women, incidence of syphilis 434
— syphilis of, treatment 445
— typhoid fever in 482
— vaccination of 494
Infected burns 68
Infections, local, alopecia due to 22
Infectious diseases prevention 222
— — — anthrax 222
— — — diphtheria 222
— — — — treatment of 'carriers' 224
— — — syphilis 224
— — — tuberculosis 222
Infective jaundice, alkalis in 231
Influenza 224
— and acrodynia 21
— alkali reserve in 227
— alopecia areata as a sequela 22

PAGE
Influenza, blood in 227
— among children 227
— chloral hydrate gargle in 228
— chronic 226
— effect on epilepsy 226
— epidemiology 225
— etiology 224
— and eye affections 152
— mental disease 271
— in old age 227
— simulated by typhoid fever 482
— simulating acute abdominal lesions 226
— and the throat 462
— vaccine therapy 463
Influenzal vaccines and rheumatoid arthritis 301, 305
Inguinal hernia (*see* Hernia)
Inhalation of dust, *x*-ray study of 506
Inhalers, semi-automatic nitrous oxide, etc. 519
Inoculation for chicken-pox 86
Insomnia in erythrœdema 150
— and sleep, psychological aspect 358
Instillation for tuberculous bladder 49
Institutions for inebriates 554
— maternity and private 559
— for mental treatment 544, 551
— nursing 558
Internal secretion, general principles 139
Interstitial keratitis, *x* rays in 366
— nephritis and congenital syphilis 444
Intertrigo 228
— choleval in 387
— due to waterproof coverings 228
Intestinal lavage in arteriosclerosis 40
— obstruction 228
— stasis in relation to cancer 70
Intestine, drainage of, in peritonitis 333
— syphilis of 433
Intestine, small, surgery of 228
— — value of enterostomy 229
— tuberculosis of 229
Intracranial pressure changes in epilepsy 144
Intramuscular sulphur injections in skin diseases 387
Intranasal operation in frontal sinusitis 285
Intra-ocular hæmorrhage prevented by venesection 75
Intraspinal therapy in neurosyphilis 438
Intrathecal serum injections in tetanus 450
— therapy in neurosyphilis 438
Intrathoracic pressure in thoracic surgery 455
Intratracheal anæsthesia by the nasal route 29
Introduction 1
Intubation in laryngeal diphtheria 107
Iodide in congenital syphilis 445
— of iron in phlyctenular ulcers 96
Iodine and glycerin in gonorrhœa 197
— and honey in cerebrospinal fever 82
— injections in plague 337
Iodinosol, an absorbable form of iodine 511
Iodoform emulsion in bubo 85
— ointment in conjunctivitis 155
Iodoformized vaseline in bubo 85
— xylol in bubo 85
Ionization, zinc, in chronic otorrhœa 114
— — local sepsis 120
Ipecacuanha, inhalation of, causing asthma 42
Iridectomy in glaucoma 191
Iridocyclitis, sugar injections in 165
Iris, prolapse of 158
Iritis, aspirin in 158
Iron and arsenic in alopecia areata 22
— — relapsing fever 370
— reduced, and ferrous sulphate in anæmia 25
Iron-smelters and cataract 74
Irritability, nervous, in angina pectoris 33
Isotonic salt solution in anaphylaxis 32
Itch (*see* Scabies)
Itching, relation to adrenalin deficiency 117

PAGE
JACKSONIAN spasms in brain tumours .. 143
Jalaguier's operation for hare-lip .. 202
Jam and food control 167
Jaundice following antisyphilitic remedies 429, 430, 432
— and blackwater fever 46
Jaundice, epidemic infectious .. 230
— — — and antisyphilitic treatment .. 230
— hæmolytic, splenectomy in 399
Jaundice, infective, alkalis in .. 231
Jaw, bony ankylosis of 231
— — — points in operative technique .. 232
— fractured, ecchymosis of the palate in .. 117
— upper, malignant growths of 281
Jejunal ulcer 185, 417
Jelly in diabetes 101
Joints and bones, tuberculosis in 503
— fibrous adhesions round, faradic current in 119
— of the finger, stiff, flexion and traction in 327
— loose bodies in 327
— and lungs, associated tuberculosis of .. 476
Juvenile tuberculosis, masked, clinical picture 476

KAFFIR-POX 395
Kala-azar 233
— blood examination in 233
Kalzine in hæmatemesis 200
Kaolin in cholera 87
Keloids and cicatrices, softening of 233
Kempf's psycho-analytical theories criticized 355
Keratitis, interstitial, *x*-rays in 366
— and trachoma 474
Keratoconus, operation for 96
Keratosis follicularis 96
Kernig's sign in cerebrospinal fever.. .. 80
Kharsivan in relapsing fever.. 370
Kidney, carcinoma of 241
— disease and congenital syphilis 444
— — contra-indicating operation for cancer of rectum 369
— — pain in 238
— — and skin troubles 391
— function of, in enlarged prostate .. 244
Kidney function tests 234
— — — blood examination for urea .. 235
— — — phenolsulphonephthalein 235
— — — in toxæmias of pregnancy .. 341
— — — urea concentration in urine .. 235
— — — water and chlorides 234
— horse-shoe, nephrolithotomy in 238
— involved in typhus fever 238
— permanent drainage of the only 239
— stone in 242
Kidney, surgery of 237
— — contra-indications 489
— — pyelography, contra-indications .. 237
— tuberculosis of 239
— tumours of 240
— *x*-ray examinations of 506
— (*see also* Nephritis ; Renal Affections)
Kinetic system, relation to static 400
Klebs-Löffler bacillus in cats.. 104
Kleinschmidt's operation in ectopia vesicæ 148
Klippel-Feil syndrome 287
Knee and hip, treatment of burns 68
Knee-joint, tuberculosis of, in children .. 317
Knuckle-joints stiff, flexion and traction in 327
Köhler's disease of the scaphoid, *x*-ray diagnosis 504, 505
Kollman's dilators in urethritis and stricture 490
Kondoléon's operation in elephantiasis .. 120
Krait, bite of 396
Kuemmel's disease 396
Kyphosis in Kuemmel's disease 396

PAGE
LABOUR, dry 244
— during heart disease 205
Labour, management of 243
— premature, advocated on maturity of child 244
— 'prophylactic forceps' operation .. 244
— version 243
Lachrymal sac, removal of, anæsthesia in .. 162
Lactagol for increasing breast-milk .. 511
Lactate of sodium in diabetes 103
Lactic acid in gout and rheumatism .. 373
Lactose and buttermilk in dyspeptic disorders of the young 111
— in cæcal constipation 95
Lagrange's sclerectomy modified for kerataconus 96
— — in glaucoma 191
Lamp, thermolite, for therapeutic purposes 525
Landry's paralysis after antityphoid inoculation 485
Laryngeal and aural complications of typhus 487
— diphtheria, intubation in 107
— growths and dyspnœa 467
— papillomata, radium in 366
— paralysis, associated with breast tumour 245
— stenosis 246
Laryngitis, fibrinous 247
Laryngoscopic mirrors 520
Laryngoscopy 140
Laryngospasm and paratyphoid defect .. 245
Larynx, affections of 245
— angioma of 247
— carcinoma of 246
— foreign bodies in 140
Lassar's paste with cehasol in eczema .. 387
'Late rickets' as manifestation of cœliac disease 90
Lateral sinus thrombosis 114
— ventricles, puncture of, in hydrocephalus 81
Lavage, bowel, in arteriosclerosis 40
— gastric, in dilated stomach 406
— pelvic, in leukoplakia of bladder 51
— — with silver nitrate in infant pyelitis .. 361
Laxative, peristaltin as a 512
Lead acetate in hæmoptysis 479
— and opium lotion in eczematoid dermatitis 98
— poisoning 341
Left-handedness (*see* Sinistrality)
Leg ulcers, choleval in.. 387
— — salt dressings in 488
Legg's disease 322
Leishmaniasis (*see* Kala-azar ; Tropical Ulcer)
Leprosy 247
— chaulmoogra oil in.. 248
— oscol stibium in 512
— stages in 248
Leucocytic formula, normal, investigations re 62
Leucocytosis, mononuclear 249
Leucopenia in diabetes 101
Leucorrhœa, cervical, treatment 493
Leukæmia 249
— acute myeloblastic 249
— and glandular fever 189, 250
Leukæmia, lymphatic, in the skin.. 251
— mononuclear leucocytosis 249
— splenectomy in 398
— stain for differentiating 250
Leukoplakia, cancer and syphilis due to .. 281
— of the bladder 50
Lice in etiology of relapsing fever 370
— — typhus 486
Lichen planus 252
Ligaments, adventitious, simulating cervical ribs 85
Ligation of the carotid artery, dangers .. 497
Ligature operation in hæmorrhoids.. .. 201
— in snake-bite 396
Limbs, artificial, sites of amputation in relation to 24
Lime-water, etc., in varicose ulcer 497
Linitis plastica, *x*-ray diagnosis 500

PAGE
Lipoid constituents in the blood 57
Lipoma in anterior mediastinum 461
— perirenal 241
Lips, cancer of 281, 282
— tuberculosis of 394
Lithates in physiology of gout 373
Liver abscess and amœbic hepatitis 23
— — paratyphoid fever 331
— cirrhosis of, and syphilis 434
Liver function tests 252
— — — 'difference value' 253
— lesions and congenital syphilis 444
— — following antisyphilitic remedies .. 429
— and lung affections with herpes zoster .. 209
— medication in night blindness 164
— *x*-ray examination 502
'Lobinol' in rhus dermatitis 374
'Local tetanus' without trismus 451
Lockhart-Mummery's operation for prolapse of rectum 369
Loewi's mydriasis test for hyperthyroidism 129
Loose bodies in joints 327
Lumbar puncture in congenital syphilis .. 447
— — hydrocephalus 81
— vertebra, 5th, sacralization of 504
Lunar caustic for ulcer of leg 488
Lung, abscess of, treatment 461
— diseases and antityphoid inoculation .. 485
— examination of, by bronchoscopy .. 66
— — during pregnancy with heart disease 205
Lung, gangrene of 253
— graduated operative treatment in empyema 455
— gunshot wounds of 461
— and liver affections with herpes zoster .. 209
— paraffin in, for phthisis 481
— surgery of, in bronchial fistulæ 460
— — bullet wounds 456
— syphilis of 433
— *x*-ray examinations of .. 66, 461, 506
Lupus erythematosus due to carious tooth 254
— — and epithelioma 391
Luzardis eye drop-bottles 515
Lymph glands, syphilis of 433
Lymphadenitis and congenital syphilis .. 444
Lymphatic glands in the neck 254
— — — enlargement of, tonsillectomy in .. 254
— — — tuberculosis of 254
— leukæmia with primary manifestations in the skin 251
Lymphoblastosis, acute benign 250
— differentiation from glandular fever .. 250
Lymphocytes differentiated from myelocytes 250
Lysol in alopecia areata 22

McBURNEY incision in appendectomy 37
Magnesia and sulphate of sodium in cæcal constipation 95
Magnesium sulphate with colonic injection of ether 29
Malaria 256
— with enteric fever 483
— mosquito-eating fish reducing incidence 256
— recurrence 259
— salvarsan in 259
— Wassermann test in 258
Malarial origin of blackwater fever 46
Malformations and congenital syphilis .. 444
Malt extract in dyspepsia of the young .. 111
— hordine as a substitute 511
Malta fever 260
Manganese collosol in carbuncle 74
Manic-depressive psychoses (*see* Mental Disease)
Manometer for respiratory function tests .. 371
Marcussen's preparation for scabies .. 376
Marmalade and food control 167
Marriage of syphilitics 428
Masked juvenile tuberculosis, clinical picture 476
Massage, cardiac, in anæsthetic shock .. 27
— in chorea 89
— infantile paralysis 222
— of the membrana tympani 98
— with ointment in trachoma 474
— of peripheral nerves 288, 289
— prostate in chronic prostatitis 349
— — urethritis 490
— in seminal vesiculitis 385
Mastitis, treatment by foreign protein .. 303
Mastoid process, operation on 113
Mastoiditis, B.I.P.P. in operation cavity .. 113
— during Graves' disease 200
— importance of early diagnosis 113
— latent or primary 113
Maternity and child welfare .. 260
— — — milk assistance scheme 260
— — — value of dental clinics 260
— and private nursing homes 559
Maxillary sinusitis 286
Mayo clinic methods in surgery 420
Measles 261
— immunity of breast-fed infants 262
— in monkeys 261
— pilocarpine in œdema of the glottis subsequent to 262
— with pre-existing Graves' disease .. 199
Mediastinum, anterior, lipoma in 461
— posterior, suppuration in 461
Medical curriculum, psychology in 356
— inspection of schools 380
— and scientific societies 567
— — periodicals 568
Medical and surgical appliances 513
— trades directory 570
Megalocolon, congenital 211
— surgical treatment 91
Megaduodenum, *x*-ray diagnosis 501
Megasigmoid, *x*-ray diagnosis 501
Melancholia (*see* Mental Disease, Manic-depressive Psychoses)
Membrane, incision of, in acute otitis media 112
Meningococcal septicæmia 81
Meningitis 263
— blastomycotic 263
— and ocular traumatism 152
— simulated by rheumatism 372
— suppurative, with paratyphoid fever .. 331
— tuberculous 263
Meningotyphoid in infants 483
Menopause, condition of thyroid gland at .. 470
Menorrhagia, antuitrin in 509
Menses, relation to ovarian headaches .. 328
Menstrual disorders, medicaments for 509, 511, 512
Mental deficiency, certified institutions and houses ofr 551
Mental disease 263
— — and alcohol 271
— — delinquency and crime 272
— — dementia præcox 265
— — — — auditory hallucinations in .. 267
— — — — auto-intoxication in 265
— — — — coprostasis as a cause 266
— — — — psycho-analytic standpoint .. 266
— — — — therapeutic immunization in .. 266
— — heredity in 264
— — and influenza 271
— — institutions and private homes for 544
— — manic-depressive psychoses 267
— — — — Freud's explanation 267
— — — — relation to thyroid gland .. 267
— — moral imbecility 274
— — occupational therapy in 275
— — paranoid psychoses founded on homosexuality 268
— — parole system in 275
— — psycho-analytical principles 276
— — and sinistrality 386
— — suicide 275

PAGE
Mental disease and syphilis 269, 436
— overwork as cause of diabetes 101
— treatment for enuresis of children .. 492
Merck's 'choleval' in skin diseases .. 387
Mercurialized serum in neurosyphilis .. 439
Mercuric chloride in retention with enlarged prostate 51
Mercurochrome in diphtheria carriers .. 107
Mercurochrome-220 in gonorrhœa 193
— in infective eye affections 163
Mercurophen in eye affections 164
Mercurosal in syphilis 511
Mercury bichloride for phlyctenular ulcers .. 96
— — tuberculous bladder 49
— in congenital syphilis 445, 446
— lichen planus 252
— ointment, ammoniated, in eczematoid dermatitis 98
— oxycyanide in glaucoma 192
— — oxycyanide of, for V.D. work .. 512
— — vesical leukoplakia 51
— salts in snake-bite 396
— with silver-salvarsan in syphilis 425
— toxic effects of 429
Mesentery compressing duodenum causing dilated stomach 405
Metabolism, basal, study of 127
Metals, soluble salts of, in snake-bite .. 396
Meteorism, treatment by foreign protein .. 303
Methyl alcohol, poisoning by 339
Methylated spirit friction for sweating and irritation of skin 150
Methylene blue in infant pyelitis 361
— — silver in gonorrhœal rheumatism .. 196
Meydl-Moynihan method in ectopia vesicæ .. 148
Micturition, difficulty of, in tetanus 452
Mid-brain or paleocerebellar type of postural hypertonus 402
Middle-ear disease (*see also* Otitis Media) .. 112
Midwifery case, fitted 520
Milk assistance scheme for nursing mothers 260
— breast-, increased by lactagol 511
— colouring matter prohibited in . .. 167
— in infant feeding 219, 220
— injections in eye affections 164
— — influenzal bronchopneumonia .. 228
— — and non-specific protein therapy .. 309
— supply in cervical adenitis 254
Milk-pox, Kaffir 395
Miners' nystagmus 219
— — a disease of the nervous system .. 314
Mirrors, laryngoscopic 520
Miscarriage induced in mitral stenosis .. 206
Mitral stenosis and congenital syphilis .. 444
— — pregnancy with 204
Monkeys proved subject to measles 261
Moral imbecility 274
Morphine in epidemic hiccough 211
— hæmoptysis 479
— intestinal surgery 229
— peritonitis 333
— poisoning 340
— in tetanus 451
Motorists' soap for removing grease 511
Motor nerves, neuritis of, electrotherapy in .. 119
— power of the stomach 180
Mouth and face surgery 278
— — — angiomatosis of parotid gland .. 279
— — — cysts of thyroglossal duct .. 281
— — — malignant disease 281
— — — mixed tumours 278
— — — parotid fistula 279
— — — tumours of the face 279
Moving-grid diaphragm in *x*-ray apparatus .. 503
Mucosæ and skin, familial hæmorrhages in .. 165
Mucous deficiency in throat, colds due to .. 463
Multiple sclerosis 282
— — cerebrospinal fluid in 282
— — *no* connection with syphilis 282
Multiplex xanthoma, blood findings .. 499
Mumps 283
— complicated by orchitis 284
— — — feminism following 284
— repeated attacks in same individual .. 283
— simulated by glandular fever 189
Murphy technique in bony ankylosis of jaw 231
Muscle-flaps in bronchial fistulæ 460
— closing of septic bone cavities 327
Muscles, skeletal, static system and hypertonicity of 400
Muscle-tonus (*see* Static System)
Muscular dystrophy, pineal body in 137
Musk in gas gangrene 481
Myelitis, disseminated, and optic neuritis .. 314
Myeloblastic leukæmia, acute 249
Myelocytes differentiated from lymphocytes 250
Myocardial disease, etiology 42
Myocarditis complicating scarlet fever .. 377
Myotonia congenita, pineal body in 137
Myxœdema following thyroid surgery .. 472

NAILS, shedding of, in erythrœdema .. 150
Narcissism and dementia præcox .. 266
Nasal accessory sinuses 284
— — — disease of, with bronchitis and bronchiectasis 284
— — — — in children 284
— — — — and optic neuritis 152
— — — frontal sinusitis 285
— — — malignant disease of 286
— — — maxillary sinusitis 286
Nasal breathing, how far in common use .. 371
— drill as anti-tuberculosis measure for children 255
— route, intratracheal anæsthesia by .. 29
Neck, burns of, treatment 67
— deformity of, due to goitre 467
— lymphatic glands of (*see* Lymphatic Glands) .. ..
— veins in, in diagnosis of goitre 467
Neckless men 287
Needle, blood-collecting 521
— case, hypodermic 519
— self-registering puncture 520
— steel, sterilizer for 524
Neocerebellum, rôle of, in control of static motility 401
Neokharsivan in congenital syphilis .. 445
— course in syphilis 427
Neosalvarsan in balanoposthitis 169
— epidemic jaundice 230
— gangrene of the lung 253
— prophylactic treatment of syphilis .. 426
— pyelitis and cystitis 238
— toxic effects following 430
— (*see also* Novarsenobenzol)
Nephrectomy, progressive 238
— in epithelioma of renal pelvis 241
Nephritis complicating chicken-pox .. 86
— and congenital syphilis 441, 445
— chronic, and protein intake 39
— following antisyphilitic remedies .. 429
— — injections of salvarsan 108
— glomerular, following small-pox 395
— kidney function tests in 234, 236
— in pregnancy 342
Nephrolithotomy in horse-shoe kidney .. 238
Nerves, motor, neuritis of, electrotherapy in 119
— peripheral, nutritional treatment .. 289
— — postural treatment 286
Nerves, peripheral, surgery of 288
— — — autogenous transplantations in .. 295
— — — causalgia 293
— — — contra-indications .. . 289
— — — end-results 291
— — — grafting in 292, 294
— — — pre-operative measures 288
— — — suturing in 290, 292
— — — — degree of recovery following .. 294

PAGE
Nerves, peripheral, surgery of, suturing in, vagaries of reunion 300
— — — tendon transplantation in .. 294
— — Tinel's sign in recovery of 294
— resection of, in stomach surgery 413
Nervous breakdown, shock in 357
— effects due to ascariasis 41
— system in angina pectoris 33
— — concussion injuries of 397
— — disturbances in goitre 468
— — and endocrinology 124
— — miners' nystagmus and the 314
— — and reproductive organs in dementia præcox 265
— — sinistrality 386
— — syphilis of (*see* Syphilis)
— unrest causing dyspepsia in infants .. 111
Nettle rash, etiology 389
Neuralgic pain, balmosa in 509
Neurasthenia in seminal vesiculitis 384
Neuritis of motor nerves, electrotherapy in 119
— optic (*see* Optic Neuritis)
— retrobulbar, due to tobacco 160
— — novarsenobenzol in 164
Neurological aspect of ophthalmic cases .. 153
Neurological surgery 295
— — brain 295
— — classification of cerebral tumours .. 296
— — hexamethylenamine in 299
— — peripheral nerves 288, 300
— — pituitary disorders 297
— — spinal cord 299
— — studies in cerebrospinal fluid circulation 297
— — ventriculography 298
Neuroretinitis, sugar injections in 164
— novarsenobenzol in 164
Neuroses, autosuggestion in the cure of .. 360
— leading to insomnia 358
— phantasy as the root of 358
— shock in relation to 357
— of soldiers, adaptation in 357
— suggestion in causation of 359
Neurosyphilis (*see* Syphilis of Central Nervous System)
Newborn, cerebrospinal fever in 80
— syphilis in 443
— scarlet fever in 377
— vaccination of 494
Nightmare in cæcal constipation 94
Nitrate of silver (*see* Silver Nitrate) .. 349
Nitrobenzol poisoning 339
Nitrogen in the blood 58
— excretion in pulmonary tuberculosis .. 476
— and hepatic failure 252
Nitroprusside test for acetone in the urine .. 491
Nitrous oxide inhaler 519
Non-infected burns 68
Non-specific antigen in bacillary dysentery .. 110
Non-specific protein therapy .. 300
— — — conditions for which advocated .. 303
— — — desensitization to food idiosyncrasies 310
— — — horse serum in hæmophilia .. 308
— — — — purpura 308
— — — logic of 301
— — — milk injections in 309
— — — peptone injections in asthma .. 303
— — — — — epilepsy 304
— — — — — fibrositis 305
— — — — — long-continued pyrexial infection 307
— — — popular fallacies exposed 301
— — — and skin eruptions 390
Non-union of fractures, femur neck .. 524
— — foreign proteins in 303
Nose and throat affections, diathermy in .. 120
Note-book and addresses 574
Novarsenobenzol in diabetes 102
— neuroretinitis 164

PAGE
Novarsenobenzol in retrobulbar neuritis .. 164
Novarsenobillon and congenital syphilis 445, 447
Novocain and adrenalin in phrenic blockage 336
— — and potassium sulphate in eye affections 162
— subcutaneously during cataract operations 75
Nucleinate of silver in urethritis 490
— soda in cardiac weakness 488
Nursing institutions 558
Nutritional treatment of peripheral nerves .. 289
Nystagmus, miners', a disease of the nervous system 314
— — Snellen's test in 219

OATMEAL diet for diabetics .. 102, 103
Obesity contra-indicating operation for cancer of rectum 369
Obstetrics, x-ray examination in 507
Occupational therapy in mental disease .. 275
Ochsner treatment for appendicitis 36
Œdema of the glottis after antityphoid inoculation 485
Œsophagoscopy 141
Œsophagus, atresia of, x-ray diagnosis .. 499
— foreign bodies in 141
Official and trade directory 564
Oil of almonds, etc., in varicose ulcer .. 497
— chaulmoogra, in leprosy 248
— chenopodium in ankylostomiasis .. 34
Oil-ether rectal anæsthesia 30
Oily solutions for tuberculous bladder .. 49
Olfactory vasomotor rhinitis 204
Olive oil and scarlet red in trachoma .. 474
Open-air treatment in erythrœdema .. 150
— — surgical tuberculosis 316
Ophthalmia, gonorrhœal, serum and vaccine therapy in 162
— neonatorum 155
— — and gonorrhœa 196
— sympathetic, sodium salicylate in .. 160
Ophthalmology, preventive .. 313
— — miners' nystagmus 313
— — use of goggles in 313
Opium in carbuncle 74
— and gall in hæmorrhoids 201
— lead lotion in eczematoid dermatitis .. 98
Optic neuritis 314
— — and choked disc, differential diagnosis 157
— — in disseminated myelitis 314
— — encephalitis lethargica 314
— — and nasal sinus disease 152
— — papillœdema 157
Oral sepsis and alopecia 22
— — x-ray examination of teeth 507
Orange-juice in diabetes 103
Orchic compound tablets for glandular deficiencies 511
Orchidocœlioplastomy in undescended testicle 448
Orchidopexy in undescended testicle .. 448
Orchitis complicating cerebrospinal fever .. 81
— — mumps 284
— from muscular trauma 448
Organic phosphorous in eye affections .. 160
Orthopædic surgery 315
— — congenital dislocation of hip 320
— — flat-foot 318
— — infantile paralysis 318
— — loose bodies in joints 327
— — open-air treatment in tuberculosis .. 316
— — pseudo-coxalgia 322
— — recurrent dislocation of shoulder .. 319
— — scoliosis 318
— — septic bone cavities 64, 327
— — special organization advocated .. 315
— — static or postural deformities .. 317
— — stiff finger-joints 327
— — ununited fractures of neck of femur .. 524
Os calcis, supernumerary 505

PAGE
Oscol stibium in leprosy, etc. 512
Osteomalacia 328
— antuitrin in 509
Osteomyelitic cavities, treatment .. 64, 327
Osteomyelitis simulated by rheumatism .. 372
Otitis media, acute 112
— — — incision of the membrane in .. 112
— — — operation on the mastoid process 113
— — — removal of tonsils and adenoids in 113
— — — Wright's solution in 112
— — chronic, conservative treatment .. 113
— — suppurative, and brain abscess .. 115
— — — cavernous sinus thrombosis .. 151
— — — lateral sinus thrombosis 114
— — in typhus 487
Otorrhœa, chronic, zinc ionization in .. 114
Ovarian headaches 328
— — corpus luteum in 328
— — relation to menses 328
— compound tablets in ovarian deficiency 512
Overwork as a cause of diabetes 101
'Own urine' test in tuberculous epididymitis 450
Oxidizing agents in snake-bite 396
Ox liver in night blindness 164
Oxycyanide of mercury in glaucoma .. 192
— — for V.D. work 512
— — vesical leukoplakia 51
Oxygen collector, Roberts' pattern 521
— in epidemic hiccough 211
— injections in bronchopleural fistula .. 457
— — influenzal bronchopneumonia .. 228
— insufflation in morphine poisoning .. 340
Oxyuris vermicularis, bismuth carbonate in 328
— — as a cause of pruritus ani 350

PALATE, horse-shoe ecchymosis of, in fractured jaw 117
Paleocerebellar or mid-brain type of postural hypertonus 402
Paleocerebellum, rôle of, in control of static motility 401
Palladium salts in snake-bite 396
Pallidal or striatal types of postural hypertonus 402
Pallido-pyramidal type of posture hypertonus 402
Pa-mol ointments 512
Pancreas in cœliac disease 90
— cysts of 329
— in diabetes mellitus 99
Pancreas, diagnosis of disease of 328
— disease of, tests to be discarded 329
— effect of endocrine glands on 125
— function tests 329
Pancreas, surgery of 329
Pancreatic amylopsin in blackwater fever .. 47
— emulsion in erythrœdema 150
— extract in sprue 399
— and hepatic insufficiency 253
Pancreatin in sprue 399
Pancreatitis causing biliary obstruction .. 170
Pannus, fleshy, in granuloma, treatment .. 473
Papillæ, hypertrophied anal, and pruritus ani 350
Papillœdema and optic neuritis 157
Papilloma of the bladder 54
— laryngeal, radium in 366
Papillomatous epithelioma of the renal pelvis 241
Paracentesis in acute otitis media 112
Paraffin in amœbiasis.. 23
— cæcal constipation 95
— film in burns 68
— in lung cavities in phthisis 481
Paralysis of accommodation, diphtheritic.. 106
— agitans, rigidity type of postural hypertonus 402
— general, mercurialized serum in 439
— infantile, treatment 318
— Landry's, after antityphoid inoculation.. 485

PAGE
Paralysis, laryngeal, associated with breast tumour 245
— of the stomach causing acute dilatation.. 405
Paranoid psychoses and homo-sexuality .. 268
Paraplegic patients, treatment of bladder in 51
Parathyroid defect and laryngospasm .. 245
— gland extract in laryngospasm 245
— — function of 133
— — myxœdema following removal of .. 472
— tablets for parathyroid deficiency 512
Paratyphoid fever 330
— — constancy of manifestations 482
— — due to eating cream tarts 330
— — and phthisis 483
— — prophylactic inoculation 484
— — various secondary conditions .. 331
Paravertebral resection in phthisis 481
Parenteral infection in dyspeptic disorders of children 110
Parole system in mental disease 275
Parotid fistula, operative treatment .. 280
— gland and duct, surgical affections of .. 279
Parotitis and cerebrospinal fever .. 80, 81
— coincident with mumps 284
Paroxysmal hæmoglobinuria, proteins in .. 303
Parrish's food, ferruginous syrup as a substitute 510
Patella, congenital dislocation of 505
Payer's clamps in surgery of the colon .. 91
Pelvic infection 332
— — treatment of peritonitis 332
— lavage in leukoplakia of the bladder .. 51
— — with silver nitrate in infant pyelitis .. 361
Pelvic varicocele 332
— — hot douching deprecated 332
Penile clamp, improved 521
— hypospadias, operation for 490
Penis in fourth venereal disease 169
— primary diphtheria of 106
Pentosuria 100
Pepsin, etc., compresses in keloids and cicatrices 233
Peptone in asthma 303
— averting anaphylaxis 32
— capsules, for oral administration of foreign proteins 512
— in epilepsy 304
— long-continued pyrexial infection .. 305
— milk as an alternative 309
— in varieties of fibrositis 305
Perchloride of mercury in conjunctivitis .. 155
Pericarditis complicating scarlet fever .. 377
— suppurative, pericardiotomy for .. 453
Perineal incision in cancer of rectum .. 367
— lipoma 241
— prostatectomy, results 346
Perinephritic abscess, post-vaccinal.. .. 485
Periodicals, medical and scientific 568
Peripheral nerves (*see* Nerves, Peripheral)
Peristaltin as a laxative 512
Peritonitis 333
— chronic, and congenital syphilis 444
— drainage of the intestine essential .. 333
— operative treatment, in pelvic infection.. 332
— from typhoid bacillus 485
Permanganates in cholera 87
— gangosa 173
— in gonorrhœa 103, 197
— irrigation with, in urethritis 490
— in snake-bite 396
Pernicious anæmia 334
— — blood volume in 334
— — reserve needed in diagnosis 334
— — splenectomy in 335, 399
— — transfusion in 335
Perthes' disease 322
Perversion, sexual, and mental disease .. 268
Pessary, improved rigid Napier's stem .. 522
Phakoerisis for cataract 78
Phantasy as the root of neuroses 356

PAGE
Pharmacy, progress of 509
Pharynx, carcinoma of, x rays in 216
Phenol (*see* Carbolic Acid)
Phenolsulphonephthalein test for kidney function 235
Phimosis in enuresis of children 492
Phlebitis due to typhoid bacillus 484
Phlyctenular disease in juvenile tuberculosis 477
— ulcers 96
Phosphate of lime in physiology of rheumatism 373
Phospholipin in coagulation of the blood .. 59
Phosphorus, organic, in eye affections .. 169
Photo-micrographic apparatus 522
Phrenic nerve, temporary blockage of, method 336
Phthisis (*see* Tuberculosis, Pulmonary)
Phytin in arthritis 512
Picric acid in gonorrhœa 197
Piles (*see* Hæmorrhoids)
Pilocarpine as hair tonic in seborrhœa .. 383
— in œdema of glottis after measles .. 262
Pineal gland, function of 137
‘ Pink disease ’ 150
Pituglandol in diabetes 103
Pituitary disorders, operative measures .. 297
— dystrophy, antuitrin in 509
— extract in intestinal surgery 229
— — as tonic to bowel muscle 345
— gland and congenital syphilis 444
— — function of 135
— — rôle of, in diabetes 99
Pituitary surgery, instrument for .. 336
— tumour and eye affections 153
Plague 337
— bacteriology of 337
— rats in etiology 337
Plastic anæmia, acute, due to x rays .. 363
— method in ectopia vesicæ 148
— surgery in stricture of urethra 491
Plates for x-ray apparatus, improved .. 499
Platinum salts in snake-bite.. 396
Pleura, closure of in empyema 457
— in thoracic surgery 452, 455
Pleurisies compared 457
— complicating paratyphoid fever 331
Pleuroscopy in empyema 457
Pneumococcic pleurisy, aspiration in .. 457
‘ Pneumomechanical ’ goitre heart 468
Pneumonia 337
— and anti-influenzal vaccine 463
— and ascariasis 41
— camphor in 338
— and empyema 455
— glucose in 338
— heart failure in 337
— serum treatment in 338
Pneumoperitoneum, x-ray diagnosis .. 502
Pneumothorax apparatus, artificial 522
— artificial, in phthisis 479
— aspiration in 455
Poison oak extract in rhus dermatitis .. 374
Poisoning 339
— by arsenic, relation to scleroderma .. 381
— arseniuretted hydrogen 339
— belladonna berry 379
— borax 340
— carbon monoxide 340
— colubrine 396
— lead 341
— methyl alcohol 339
— morphine 340
— nitrobenzol 339
— rubber tubing 340
— senecio 341
Poisonous shrubs in a public park 379
Polak's operation for spreading peritonitis .. 332
Poliomyelitis, acute anterior (*see* Infantile Paralysis)
Politzer's tube adapted to two fresh uses .. 98
Pollen idiosyncrasies, desensitization to .. 311
PAGE
Pollen proteins for cutaneous tests.. .. 312
— in treatment of hay fever 204
Polycythæmia in hypopituitarism 136
Portal cirrhosis and congenital syphilis .. 444
Position, Schnitzler's, in dilated stomach 406, 409
— Trendelenburg's, in suppuration of mediastinum 461
Post-paralytic postural hypertonicity (*see* Postural Hypertonus)
Posture in diagnosis of ascites 41
— deformities, paralysis agitans rigidity .. 402
— hypertonus (*see also* Static System) .. 401
— — decerebrate rigidity 402
— — paralysis agitans rigidity 402
— — paraplegia in flexion 402
— — spastic rigidity.. 402
— — spasticity 400
— or static deformities, treatment 317
— system (*see* Static System)
— treatment of dilated stomach .. 406, 409
— — peripheral nerves 289
Potassium bromide in epilepsy 145
— — and sodium biborate in epilepsy .. 145
— in cancer 69
— iodide in Buerger's disease 463
— — in oil for tuberculous bladder .. 49
— permanganate in gonorrhœa .. 193, 197
— sulphate, novocain, and adrenalin in eye affections 162
Pottery ware as a source of lead poisoning .. 341
Pott's disease and Klippel-Feil syndrome 287
— — rheumatism 372
Potter's method of version in labour .. 243
Precipitated sulphur *vice* flowers of sulphur in scabies 376
Pregnancy after operation for genital prolapse 186
— albuminuria in 342
— and antityphoid inoculation 485
Pregnancy, disorders of 341
— — pre-natal death 342
— effect of x rays on fœtus 366
— in gonorrhœa 197
— heart disease 204
— and infants, incidence of syphilis in .. 434
— nephritis in.. 342
— and syphilis 434, 446
— toxæmias of, tests in 342
— x ray examination in 507
Pre-natal death, general considerations .. 342
Presbyopia, heterophoria in.. 158
Pressure apparatus in thoracic surgery 455, 456
— of cerebrospinal fluid 83
Prevention of infectious diseases (*see* Infectious Diseases)
Proctoclysis in dilatation of stomach 406, 409
Prolapse, genital (*see* Genital Prolapse)
— of the rectum (*see* Rectum)
‘ Prophylactic forceps ’ operation in labour 243
Prostate, abscesses of.. 349
— carcinoma of 348
— disorders of, causing retention 343
— enlarged, contra-indicating operation on ureter.. 489
— — facts favouring early operation .. 345
— — function of the kidneys in 344
— — remote results of operation for .. 348
— — retention in 51
— — x rays in 366
— secondary infection in gonorrhœa .. 195
Prostate, surgery of 343
— — post-operative distention of bowel .. 345
— — pre-operative measures 345
— tuberculosis of 449, 450
Prostatectomy, complications following .. 346
— contra-indications 345
— median perineal, advantages 346
— perineal, results 346
— suprapubic, drainage in 346
— — obstruction after 347

PAGE
Prostatic massage in chronic prostatitis .. 349
— — urethritis .. 490
— obstruction, blood-pressure in .. 344
— tractor, suprapubic, use of .. 346
Prostatism, *x*-ray diagnosis in .. 344
Prostatitis, chronic, three groups of .. 349
— vaccine treatment in .. 194
Protargol in conjunctivitis .. 474
Protein, content of cerebrospinal fluid .. 83
— for cutaneous tests .. 311
— diet in hyperpiesis and chronic nephritis 39
— epidermal, in hay fever .. 203, 204
— in infants' stools .. 221
— intake in pulmonary tuberculosis .. 476
— sensitization and bronchial asthma .. 42
— — in eczema .. 117
— — in skin diseases, humoral and cellular theories .. 388
— test outfit .. 513
— therapy, non-specific (*see* Non-specific Protein Therapy)
Proximal colon, constipation of .. 93
Pruritus ani .. 350
— — Ball's operation in .. 351
— — care needed in *x*-ray treatment .. 351
— — lotions for .. 350
— — oxyuris as a cause of .. 350
Pseudo-coxalgia .. 322
— *x*-ray diagnosis .. 504
Pseudo-hay fever .. 204
Pseudo-tuberculous congestion in typhus .. 487
Psoriasis .. 351
— chrysarobin in .. 387
— drugs activating fat secretion in .. 351
— post-vaccinal .. 495
— and seborrhœic eczema .. 117, 351
— sulphur injections in .. 387
Psorospermosis follicularis vegetans .. 96
Psychic disturbances after antityphoid inoculation .. 485
— — influenza .. 271
— element in Graves' disease .. 132
— — hyperpiesis .. 39
Psycho-analysis criticized .. 352
— — the censor .. 355
— — Kempf's .. 355
— — from a physiological standpoint .. 356
— — the unconscious .. 353
— of dementia præcox .. 266
— melancholia .. 267
— treatment of mental disease .. 267
Psychological aspect of sleep and insomnia 388
Psychological medicine .. 352
— — auto-suggestion in .. 360
— — criticism of term 'suggestion' .. 360
— — the principle of endopsychism .. 357
— — suggestion in .. 358
Psychology, adaptation in .. 357
— repression in .. 354, 356
— the unconscious in .. 353
— wishes and desires in .. 354
— in the medical curriculum .. 356
Psychoses, manic-depressive (*see* Mental Disease)
Puerperal septicæmia, foreign proteins in .. 303
Pulmonary congestion in typhus .. 487
— localizations of enteric bacilli .. 483
— tuberculosis (*see* Tuberculosis, Pulmonary)
Pulse irregularities in goitre .. 468
Puncture needle, self-registering .. 520
Purpura, horse serum injections in .. 308
— foreign proteins in .. 303
— variolosa with purpura hæmorrhagica pustulosa .. 395
Pyelitis and cystitis, treatment .. 238
Pyelitis in infancy and childhood 361
— — — pelvic lavage in .. 361
— — — *x*-ray examinations in .. 361
— simulated by rheumatism .. 373
— and ureteral stricture .. 488

PAGE
Pyelography, contra-indications .. 237
— use of sodium iodide in .. 506
Pylorectomy, Billroth's method .. 413
Pyloric stenosis, congenital hypertrophic .. 407
— — operation essential in .. 185
— ulcers from senecio poisoning .. 341
Pyloroplasty *v.* gastrojejunostomy .. 409, 416
Pyogenic infections, treatment .. 387
Pyorrhœa and cancer .. 70
Pyramidal types of postural hypertonus .. 401
— and extra-pyramidal tracts influencing muscle-tonus .. 403
Pyrogallol in psoriasis .. 351

QUARTZ mercury lamp and *x* rays in tuberculous adenitis .. 365
— ultra-violet light in prostatitis .. 350
Quinidine in auricular fibrillation .. 45
Quinine amblyopia .. 160
— in blackwater fever .. 46
— as hair tonic in seborrhœa .. 383
— hydrobromide in Graves' disease .. 132
— — test in hyperthyroidism .. 130
— in liver abscess .. 24
— malaria .. 258
— Vitex peduncularis as a substitute .. 47

RADIOSCOPY in empyema .. 457
Radiotherapy (*see also* Electrotherapeutics; *X*-ray Therapy)
— in angioma of the larynx .. 247
— bladder growths, appliance for .. 54
— cancer .. 70, 365
— — of the breast .. 65
— — prostate .. 349
— cataract .. 75
— — uterus cervix .. 363, 493
— conditions in which applicable .. 365
— depilation in ringworm .. 374
— effect of *x* rays on fœtus in utero .. 366
— epithelioma .. 393
— the Erlangen technique and malignant disease .. 362
— experimental work on animals .. 364
— in glioma of the retina .. 372
— Graves' disease .. 133
— hæmorrhagic sarcoma of skin .. 393
— hyperpiesis .. 39
— laryngeal papillomata .. 366
— in leukæmia .. 251
— myoma .. 493
— to reduce size of spleen .. 398
— in ringworm .. 365, 374
— uterine bleeding .. 149
— — relative value .. 365
Rammstedt's operation in pyloric stenosis .. 407
Rat-bite fever, salvarsan in .. 367
Rats in spread of plague .. 337
Recklinghausen's disease .. 498
Rectal anæsthesia, oil-ether .. 30
— feeding in dilated stomach .. 406
— irrigation, hot, in seminal vesiculitis .. 385
Rectified spirit and glycerin in eczema .. 118
Rectum, cancer of .. 367
— — abdominoperineal *v.* perineal incision 367
— — contra-indications to operations .. 368
— — need for earlier diagnosis .. 367
— — operability .. 368
Rectum, prolapse of .. 369
— — operation described .. 369
— — post-operative treatment .. 369
Reduced iron and ferrous sulphate in anæmia 25
Relapsing fever .. 370
— — kharsivan in .. 370
— — ticks in .. 370
Renal abscess, post-vaccinal .. 485
— compressor for *x*-ray work .. 530
— lesions and congenital syphilis .. 441

PAGE
Renal surgery (*see* Kidney, Surgery of)
— tuberculosis 239
— and ureteric calculi 242
Repressed complexes causing neuroses .. 359
Repression in current psychology .. 354, 356
Residual hearing in deaf-mutes 97
Resorcin in leukoplakia of the bladder .. 51
Respiratory function tests .. 371
Retention of urine (*see also* Urine) .. 51
Retina, detachment of 371
— — trephining in 372
Retina, diseases of 371
— glioma of 372
— impaired by observing solar eclipse .. 371
— loss of pigment in, due to scarlatina .. 371
— recurrent hæmorrhage of 372
Retinal hæmorrhages, vaccines in 151
— veins, thrombosis of, after influenza .. 152
Retinitis, albuminuric, after antityphoid inoculation 485
— — milk injections in 164
— in diabetes mellitus 101
— due to influenza 152
Retrobulbar neuritis, novarsenobenzol in .. 164
— — due to tobacco.. 160
Retroperitoneal perirenal lipoma 241
Rheumatic arthritis, seminal vesicles in .. 385
Rheumatism 372
— chronic, raising the body temperature .. 373
— gonorrhœal 196
Rheumatism and gout 373
— lactic acid in 373
— muscular, balmosa in 509
— phosphate of lime in 373
— polyarticular scarlatinal 377
— rare localizations 372
— relationship to chorea 88
— salicylates in 372
— thyroid enlargement with 199
Rheumatoid arthritis due to absence of lime 373
— — influenza vaccine benefiting .. 301, 305
Rhinitis, olfactory vasomotor 204
Rhus dermatitis 374
— — ferric chloride in aqueous glycerol in 374
— — 'lobinol' in 374
— — poison oak in 374
Ribs, cervical 84
— — adventitious ligaments simulating .. 85
— excision of in empyema 456
— resection of, in phthisis 481
— rudimentary 85
Rickets and congenital syphilis 444
— late, as a manifestation of cœliac disease 90
Rigidity, tonic 403
Ringer's solution in Buerger's disease .. 463
Ringworm 374
— depilation by radium in 374
— eczematoid 374
— infectivity of fungus in 374
— radium in 365, 374
Riva-Rocci's instrument for blood-pressure in phthisis 477, 478
Roboleine, food value of 513
Rodet's serum in typhoid fever 485
Rosacea 375
— differentiation from acne, summary .. 375
— a form of seborrhœa 375
Rubber tubing in disinfection in empyema.. 458
— — poisonous substances in 340
Rubidium iodide in cataract.. 75
Rudimentary ribs 85
Ruppe and Veau's operation for hare-lip .. 202

SABOURAUD'S technique in epidermophyton inguinale 142
Sachs-Georgi and Sigma tests, relative value 421
Sacralization of 5th lumbar vertebra .. 504
Sacro-iliac synchondrosis, rheumatism of .. 372

PAGE
Salicylate in rheumatism 372
Salicyl alcohol in local analgesia 31
— of sodium in chorea 88
— — sympathetic ophthalmia 160
Salicylosol administered by inunction .. 513
Saligenin in local analgesia 31
Saline cathartics in seminal vesiculitis .. 385
— injections in trachoma 474
— solutions in cæcal constipation 95
— — in dilated stomach 406, 409
— — gas gangrene 484
— — hæmatemesis 200
— — intestinal surgery 229
— — isotonic, in anaphylaxis 32
Salivary gland tumours 278
Salpingitis, treatment by foreign protein .. 303
Salt dressings for ulcer of leg.. 488
Salvarsan in balanoposthitis.. 169
— epidemic jaundice 230
— exfoliative dermatitis after injections .. 107
— in malaria 258
— and mercury in congenital syphilis .. 446
— in neurosyphilis 439
— prophylaxis in syphilis 425
— in rat-bite fever 367
— syphilis, resistance to 428
— toxic effects of 429
Salvarsanized serum in trypanosomiasis .. 474
Sanitation and typhoid fever 484
Sanatoria for tuberculosis 554
Sapotoxin in resistance of red cells 60
Sarcoma of the skin, hæmorrhagic multiple 393
— testis, *x*-ray treatment in.. 448
Scabies 376
— 'French' cure in 376
— 'Hardy's ointment' in—formula .. 376
— Marcussen's preparation in 376
Scaphoid, Köhler's disease of, *x*-ray diagnosis 504
— tarsal, congenitally separate tuberosity of 168
Scarlatinal arthritis followed by spontaneous dislocation of the hip 377
Scarlatiniform erythema, recurrent.. .. 149
Scarlet fever 376
— — cardiac complications in 377
— — causing loss of retinal pigment .. 371
— — and diphtheria 377
— — Döhle's inclusion bodies in diagnosis 377
— — nature of transmission 376
— — in the newborn 377
— — and scarlatiform erythema 149
— — Schultz-Charlton sign in diagnosis .. 377
Scarlet red in olive oil in trachoma 474
Schick reaction in diphtheria .. 106, 223
Schistosomiasis 378
Schistosomiasis, emetine in, for children .. 379
— Fairley's antigen test in 378
— tartar emetic in 379
Schizophrenia 266
Schnitzler's position in dilated stomach 406, 409
School medical service 379
— — — poisonous shrubs in public parks 379
Schools, inspection of 380
Schultz-Charlton sign in scarlet fever .. 377
Sciatica 380
— galvanic acupuncture in 119
— operation described 381
— simulated by rheumatism 372
— surgical treatment advocated 380
— three types 380
Scientific and medical periodicals .. . 568
— — societies 567
Sclerectomy in glaucoma 191
— keratoconus 96
Sclerodermia 381
Sclerosis, multiple, cerebrospinal fluid in .. 282
— — no connection with syphilis 282
Scoliosis, treatment 318
Scopolamine in labour 244
Scraping of the pannus in trachoma .. 473
Sea-sickness, benzyl benzoate in 510

PAGE
Seatangle tents 525
Sebaceous glands in eczema 117
Seborrhœa 382
— carbon disulphide application—method 383
— rosacea a form of 375
— 'silk-paper' test in 382
— sulphur in 383
— two characteristic marks 383
Seborrhœic eczema, relation to psoriasis 117, 351
Secondary *v.* elementary school inspection 380
Secretion, internal, general principles .. 139
Secretory power of the stomach 178
Sedative, benzyl benzoate emulsion as a 510
Seminal vesicles, tuberculosis of .. 149, 150
Seminal vesiculitis 384
— — needle for injections 384
— — neurasthenia due to 384
— — relation to rheumatic arthritis .. 385
Senecio poisoning 341
Senile decay, premature, antuitrin in 509
Sensitized serum for sheep's corpuscles, use in complement-deviation reactions .. 513
— vaccines in chorea.. 88
Sensory disturbances of cortical origin 385
— — spinal origin, heteræsthesia 397
Sepsis, local, zinc ionization in .. ; 120
— oral, in alopecia areata 22
— — *x*-ray examination of teeth 507
Septic abortion, treatment of 19
— bone cavities, methods of closing 64, 327
Septicæmia, meningococcal 81
— puerperal, foreign proteins in 303
Serpiginous ulcers of the cornea, treatment 96
Serum, anti-anthrax 509
— injections, milk as an alternative .. 309
— salvarsanized, in trypanosomiasis .. 471
— tests in syphilis 421
— therapy in anaphylaxis 32
— — in bubo 85
— — cerebrospinal fever 82
— — gas gangrene 184
— — gonorrhœa, improved.. 195
— — gonorrhœal conjunctivitis 162
— — neurosyphilis 439
— — non-specific (*see* Non-specific Protein Therapy)
— — in pneumonia 338
— — tetanus 450
— — typhoid fever 485
Sexual characters and the pituitary gland .. 135
— organs and nervous system in dementia præcox 265
— perversion and mental disease 268
Shaving-brushes, anthrax in.. 222
Shock, anæsthetic, methods of revival .. 26
— in nervous breakdown 357
Shoe-polish, nitrobenzol poisoning in manufacture of 339
Shoulder and axillæ, treatment of burns .. 67
— recurrent dislocation, surgical treatment 319
Shrapnel in lung, removal of 456
Sigma test in syphilis 421
'Silk-paper' test in seborrhœa 382
Silver nitrate in eczema 118
— — gonorrhœa 193
— — intertrigo 228
— — lavage in pyelitis of infancy 361
— — in leukoplakia of the bladder .. 51
— — œsophageal erosions 112
— — ophthalmia neonatorum 156
— — prostatitis 347
— — whooping-cough 498
— nucleinate in urethritis 490
— preparations in gonorrhœa 197
— — new, in skin diseases 387
Silver-salvarsan in syphilis 125
— — argyria following 132
Singultus and encephalitis lethargica .. 210
—, treatment 211
Sinistrality, heredity in 386
Sinistrality, high blood-pressure, and defects of speech 386
— statistics 386
Sinus, cavernous, thrombosis of 115
— lateral, thrombosis of 114
Sinuses, nasal (*see* Nasal Accessory Sinuses
Siphon drainage in chronic empyema .. 457
Sippy's method, modified, in gastric ulcer .. 184
Skeletal muscles, static system and postural hypertonicity of 400
Skin, cancer of (*see also* Cancer) .. 386
— — factors determining growth 394
— — *x*-ray treatment—method 387
— diseases, cehasol in 389
— — cholevaI in 389
— — foreign proteins in 389
Skin diseases, general therapeutics 387
Skin diseases, protein sensitization in 388
— — — humoral and cellular theories 388
— — pyogenic infections 387
— — relation to internal disorder 389
— — sulphur injections in 387
— eczema 117
Skin, epithelioma of 391
— — developing on lupus erythematosus.. 391
— — points of origin 392
— eruptions due to salvarsan 107
— — types in Hodgkin's disease .. 214
— hæmorrhagic multiple sarcoma of .. 393
— and mucosæ, familial hæmorrhages in .. 165
— reactions following antisyphilitic remedies 129
— rôle of, in rheumatism and gout.. .. 373
— tuberculides in juvenile tuberculosis .. 177
Skin, tuberculosis of 394
— — source of infection 394
— tumours of, as primary manifestation of lymphatic leukæmia 251
Skin-grafting in burns 68
— tropical ulcer 474
Skull, fractures of, ecchymosis in 117
Sleep and insomnia, psychological aspect .. 358
Sleeping sickness 471
Sliding hernia 209
Small-pox 395
— albuminuria in 395
— causes of increase 395
— diagnosed as chicken-pox 482
— relation to Kaffir-pox 395
— vaccination of newborn 494
Snake-bite 396
— experiments with rats 396
Snellen's test in miners' nystagmus .. 219
Snow blindness 158
Soap, motorists', for removing grease .. 511
Societies, medical and scientific 567
Sodium biborate and potassium bromide in epilepsy 145
— — in varicose ulcer 495
— bicarbonate after anæsthesia 27
— — in anaphylaxis 32
— — burns 68
— — methyl alcohol poisoning 339
— — pre-operative administration .. 28
— — in seminal vesiculitis 384
— — sprue 399
— chloride and sodium citrate in acute otitis media 112
— — in urine, how determined 491
— citrate in Buerger's disease 165
— glycocholate and taurocholate in cœliac disease 89
— iodide in cataract 75
— — pyelography 506
— linate in leprosy 248
— morrhuate in leprosy 248
— nucleinate of, in cardiac weakness .. 488
— salicylate in chorea 88

PAGE
Sodium salicyl. in sympathetic ophthalmia 160
— salts in eczematoid dermatitis 99
— sulphate and magnesia in constipation .. 95
Solar eclipse causing retinal impairment .. 371
Soamin in malaria 259
Sounds, new patterns 523
Souttar's operation in infantile paralysis .. 318
Sparteine in gas gangrene 184
Spas, British 559
Spasmophilia 245
Spastic rigidity type of postural hypertonus 402
Spasticity in diagnosis of tetanus 452
— in organic disease of central nervous system 401
Spatula, urethral, improved 527
Speculum for vulvovaginitis 523
Speech disorders and sinistrality 386
Spermatocele, origin 118
Spermatorrhœa in seminal vesiculitis .. 384
Sphenoidal puncture in hydrocephalus .. 81
Sphygmomanometry in phthisis 477
Spinal analgesia 30
— cord, concussion of, causing heteræsthesia 397
— — surgery of 299
— — tumours 299
— irrigation in cerebrospinal fever 82
Spine and spinal-cord affections 396
Spine, compression fracture of 396
Spirochætosis (*see* Jaundice, Infective; Rat-bite Fever) 398
Splanchnic analgesia 30
Spleen, enlargement of, in syphilis 134
— hæmorrhagic cysts of 399
— injuries of, splenectomy in 399
Spleen, surgery of 398
Splenectomy in blood dyscrasias 398
— hæmorrhagic cysts of spleen 399
— pernicious anæmia 335
— splenic anæmia 399
Splenic artery, aneurysm of 33
Splint for hare-lip 517
Sprains, ecchymosis in 116
Sprue 399
Sputum, clinical pathology of .. 400
— — — in asthma 400
Stain for differentiating lymphocytes from myelocytes 250
Stammering and sinistrality 386
Starch powders in eczema 118
— — erythrœdema 150
Starvation stools of infants 220
Stasis, intestinal, and dementia præcox .. 266
— — in relation to cancer 70
Static motility controlled by cerebellum .. 401
— and postural deformities, treatment .. 317
Static or posture system (*see also* Posture Hypertonus) 400
Static system, hypotonia in dementia paralytica 404
— — and kinetic system 400
— — muscle-tonus 403
— — — and cerebellum 404
— — — decerebrate rigidity 403
— — — diminished and increased 403
— — — how influenced by brain impulses 403
— — and postural muscular hypertonicity 400
— — — hypertonus 401
Steam cauterization for corneal ulcers .. 96
Stenosis, laryngeal 246
— mitral, and congenital syphilis 111
— pyloric, congenital hypertrophic .. 107
— — operation essential in 185
Stenson's duct, fistula of, operative treatment 279
Sterility, due to disease 342
— and seminal vesiculitis 384
Sterilizer forceps, new patterns 523
— for steel needles 523
Sternum, Duval-Barasty's operation .. 153
Stethoscopes, new patterns 524

PAGE
Stiff-finger joints, treatment 327
Still-birth caused by cord complications .. 243
— general considerations 342
Stitch in side in diagnosis of tetanus 452
Stomach, acute dilatation of .. 405
— — — causes 405
— — — surgical importance .. 405, 409
— — — symptoms 406
— carcinoma of, test-meal chart of 178
— foreign bodies in 141
Stomach, hour-glass 406
— — due to contracted scar 113
— — operation essential in 185
— — relation to malignant disease .. 406
— — *x*-ray diagnosis 406, 500
— motor power of 180
— paralysis of, causing acute dilatation .. 405
— secretory power of 178
Stomach, surgery of 407
— — acute dilatation 409
— — Billroth's operations 113, 117
— — carcinoma 409
— — chronic gastric ulcer 411
— — duodenal ulcer (*q.v.*) 414
— — gastric and duodenal ulcer (*q.v.*) .. 410
— — gastrojejunal ulceration 416
— — hæmorrhage in 414
— — nerve resection in 413
— — perforation of ulcers 411
— — pyloric stenosis 407
— — pyloroplasty *v.* gastrojejunostomy 409, 416
— syphilis of 133
— torsion of 405
— tube in dilated stomach 406, 409
Stools (*see* Fæces)
Stoutness, and operation for rectal cancer .. 369
Streptococcic pleurisy, thoracotomy in .. 157
Striatal types of postural hypertonus .. 402
Stricture, ureteral, and pyelitis 188
— urethral, treatment 490
Strophanthin and adrenalin injections .. 27
Strychnine in cardiac weakness 488
— enuresis of children 193
— sulphate in mental disease 275
— as tonic to bowel muscle 345
Stumps, amputation, and artificial limbs .. 24
— — 'spontaneous' ulcer formation on .. 25
Sturmdorf technique modified for endocervicitis 194
Subarachnoid space in hydrocephalus .. 212
Subclavian glands in cancer of the breast .. 65
Suffocation due to goitre 466
Sugar in blood 57
— — in diabetes mellitus 99
— — hyperthyroidism 129
— injections in eye affections 165
Suggestion as a cause of neuroses 360
— treatment for urinary incontinence .. 17
Suicide and mental disease 275
Sulphate of sodium and magnesia in cæcal constipation 95
Sulphur and carbonate of potash in scabies 376
— in carbuncle 71
— injections in acne 387
— — alopecia 387
— — psoriasis 387
— ointment in eczema 118
— precipitated, in scabies 376
— in seborrhœa 383
Supernumerary bones of foot 505
Suppurative meningitis with paratyphoid .. 331
— pericarditis 153
Suprapubic drainage in bladder diseases .. 52
— prostatectomy, drainage in 346
— — obstruction after 347
— prostatic tractor, use of 346
Suprarenal compound tablets in glandular dysfunction 513
— gland extract preventing shock .. 389
— — — as tonic to bowel muscle .. 345

PAGE
Suprarenal gland, rôle of, in diabetes 99
Surgery, the advance of 418
— — methods in the Mayo Clinic 420
Surgical bed-frame, improved pattern . 513
Surgical and medical appliances 513
Suturing in peripheral nerve surgery 290, 292, 294, 300
Sweating disorders 410
— excessive, in eczematoid ringworm .. 371
— in treatment of scabies 376
— profuse, in tetanus 452
Sycosis 420
— local applications in 421
Sylvius, aqueduct of, and hydrocephalus .. 216
Sympathectomy in ulcer of amputation stumps 25
Sympathetic ophthalmia, sodium salicylate in 160
Synergistic colonic analgesia 29
Syphilis 421
— abortive treatment 426
— anaemias of 434
— aorta in 31, 433, 442
— bismuth in 425
— campaign against 221
— and cancer, relation to leukoplakia .. 281
— case supporting Colles's law 436
Syphilis, cardiac 442
— of the central nervous system 437
— — — — early involvement 438
— — — — intrathecal therapy 438
— — — — silver-salvarsan in 425
— cerebrospinal 438
— — fluid in 437
Syphilis, congenital 443
— — and the endocrine glands 444
— — limits of Wassermann in 443
— — and nephritis 444, 445
— — predisposes to other infections .. 443
— — and tuberculosis 444
— — various diseases 444
— — treatment 445
— effect of treatment 427
— and epidemic jaundice 230
— experimental observations on rabbits .. 421
— grey oil in 425
— and hepatic cirrhosis 434
— incidence of neurosyphilis 440
— — in pregnant women and infants .. 431
— and insanity 436
— of intestines 433
— lymph glands 433
— in male, treatment 426
— and mental disease 269, 436
— mercurosal in 511
— and multiple sclerosis not connected .. 282
— neokharsivan course in 427
— paternal transmission in 436
— prophylaxis by neosalvarsan 426
— — salvarsan 425
— resistance to salvarsan treatment .. 428
— serum tests in 421
— sigma test in 421
— significance of a persistently positive Wassermann 422
— silver-salvarsan in 425
— and still-birth 435
— of stomach 433
— and tabes dorsalis 447
— toxic effects of remedies 429
— — — — precautions against 432
— Vernes' test in 422
— visceral 433
— *x*-ray diagnosis 505
Syphilitic aortitis treated surgically 31
— deaf-mutes 97
Syphilitics, marriage of 428
— transmission to offspring 429, 434
Syringes, hypodermic, etc. 518
— with peripheral nozzle 518

T.A.B. and T.A.B.C. vaccine in enteric fever 484
Tabes dorsalis 447
— — familial 447
— — hypotonia in 404
— — mercurialized serum in 439
— — simulated after antityphoid inoculation 485
Taboparesis, mercurialized serum in .. 439
Tachycardia in goitre 168
Talc powders in eczema 118
Tar in eczema 118
Tarsal scaphoid, congenitally separate tuberosity of 168
Tarsus and conjunctiva, excision of, in trachoma 173
Tartar emetic in filariasis 165
— — granuloma inguinale 199
— — kala-azar 233
— — schistosomiasis 379
Tartrobismuthate of potassium in animal syphilis 425
Teeth causing pain in glaucoma 190
— diseased, and eye affections 151
— — lupus erythematosus 254
— national clinics for care of 260
— *x*-ray examination of 507
Telangiectasis, CO_2 snow in 165
Temporosphenoidal lobe tumours and epilepsy 142
Tendon transplantation in surgery of nerves 294
Tents, sea tangle 525
Test-meal charts in gastric-analysis 175
— after operation for gastric ulcer 144
Testes and congenital syphilis 444
Testicle, atrophied, castration in 448
Testicle and epididymis, surgery of 448
— — — acute epididymitis 450
— — — castration in 448, 449
— — — ectopia testis 448
— — — epididymectomy in 450
— — — heliotherapy in 449, 450
— — — hydrocele 448
— — — sarcoma testis 448
— — — spermatocele 448
— — — tuberculous epididymitis 449
— — — varicocele 449
— undescended, treatment 448
Tetanus 450
— in army, conclusions 451
— early diagnosis in 452
— intrathecal injections, success of 450
— 'local', without trismus 451
— phrenic blockage for 376
Tetany 245
— and the parathyroid glands 133
— after thyroid surgery 472
Thermolite lamp for therapeutic purposes .. 525
Thermometer, clinical, aseptic 526
Thighs, gas gangrene of, in typhoid fever .. 484
Thoracic duct injuries, removal of tuberculous glands 255
— route advocated in diaphragmatic hernia 206
Thoracic surgery 452
— — abscesses of the lungs 461
— — bronchial fistulae 460
— — the Duval-Barasty operation .. 452
— — empyema 455
— — — air-tight drainage in 457
— — — aspiration in 455, 456
— — — in children 455
— — — closure of pleura in 457
— — — Dakin's solution in .. 457, 459
— — — disinfection in 458
— — — improved treatment 456
— — — significance of bronchial fistulae .. 460
— — — summary of treatment 458
— — — tuberculous 459
— — gunshot wound of lung . 456, 461

PAGE
Thoracic surgery, mediastinum 461
— — pericardiotomy in 453
— — pressure apparatus needless in 455, 456
— — method of exposing the heart .. 452
— — removal of bullets from lungs .. 456
Thoracoplasty, extrapleural, in phthisis .. 480
Thoracotomy in empyema 457
Thorax, right, rheumatism in 372
Threadworms, bismuth carbonate in .. 328
— in enuresis of children 492
Throat, bacteriology of 462
— brush in glass tube 525
— mucous deficiency and colds 463
— and nose affections, diathermy in .. 120
— painted with silver nitrate in whooping-cough 498
Thrombin in coagulation of the blood .. 59
Thrombo-angiitis obliterans .. 463
— — Ringer's solution in 463
Thrombosis of the cavernous sinus 115
— lateral sinus 114
— retinal veins after influenza 152
Thymus gland extract and laryngospasm .. 245
— — function of 137
— — removed in Graves' disease 471
Thyroglossal duct, cysts of 281
Thyroid disease (*see* Graves' Disease)
— extract in Darier's disease 96
Thyroid function tests 464
— — — 'basal metabolic rate' 464
— — — in hyperthyroidism 130
— gland function (*see also* Hyperthyroidism) 127
— — — and congenital syphilis 444
— — — enlargement of, with rheumatism .. 199
— — — and fevers 126
— — — manic-depressive psychoses 267
— — — at the menopause 470
— — — rôle of, in diabetes 99
Thyroid, surgery of 465
— — anæsthesia in 471
— — in children 468
— — complications after operation .. 471
— — diagnosis of malignant disease .. 470
— — enucleation in 470
— — extirpation in 470
— — in Graves' disease 468, 471
— — hæmorrhage as a complication .. 471
— — indications for 465
— — — deformity 467
— — — disturbances of circulatory and nervous systems 468
— — — dyspnœa 465
— — — malignancy 469
— — myxœdema following 472
— — operative measures 470
— — tetany following 472
— — tracheal collapse in 471
— — wounds of surrounding structures .. 471
— treatment in melancholia 267
— tumours 467
Thyroidectomy in Graves' disease 471
Ticks in relapsing fever 370
Tinel's sign in recovery of injured nerves .. 294
Tobacco causing eye affections 160
Tongue, cancer of 281
— depressor with electric light 526
— secondary vaccination of 195
Tonic fits 404
— rigidity 403
Tonsil hook, improved 526
Tonsils and adenoids, *x* rays in 366
Tonsils, diseases of 472
— — vaccines in 473
— — *x* rays in 472
— functions of 472
— — a protection and a menace 472
— — tuberculosis of 472
Tonsillectomy in acute otitis media 113
— cervical adenitis 254
— diphtheria carriers 407
Tonsillectomy in nasal sinusitis of children 285
— *x*-ray therapy a substitute 472
Tonsillitis during Graves' disease 200
Töpfer's reagent criticized 177
Torsion of the stomach 405
Torticollis and Klippel-Feil syndrome .. 287
Trachea compressed by goitre .. 466, 469
— foreign bodies in 140
Tracheal collapse in thyroid surgery .. 471
Tracheotomy deprecated in thyroid surgery 472
— in morphine poisoning 340
— tubes and forceps 526
Trachoma 473
— copper sulphate in 474
— excision and scraping in 474
— and keratitis 474
— pathognomonic signs 473
Trades directory, medical 570
Transfusion of blood in nitrobenzol poisoning 339
— — pernicious anæmia 335
— — ulcerative endocarditis 122
Trendelenburg's position in suppuration of the mediastinum 461
Trephining in detachment of the retina .. 372
— glaucoma 191
Trichophytosis complicating vaccination .. 495
'Trophic' changes in causalgia 293
Tropical ulcer 474
— — *x* rays in 474
Tropism in animals 122
Trypanosomiasis 474
— fever due to flagellate 474
Trypsin in blackwater fever 47
Tuberculin in tuberculous epididymitis .. 450
— — eyes 165
Tuberculosis of the bladder 49
— in bones and joints, *x*-ray diagnosis .. 503
— of the cervical glands 255
— in children 476
— and congenital syphilis 444
— of the eye, milk injections in 164
— — tuberculin in 165
— formula for preventive pill 512
— infectivity of 222
— of the intestines 229
— kidney 239
— lip 394
— masked juvenile, clinical picture .. 476
Tuberculosis, pulmonary 476
— — artificial pneumothorax in 479
— — associated with joint tuberculosis .. 476
— — blood-pressure in 477
— — cauterization of adhesions in .. 479
— — complement-fixation test in 478
— — complications in treatment 480
— — extrapleural thoracoplasty in .. 480
— — metabolism in 476
— — results of surgical treatment 481
— — treatment of hæmoptysis 479
— — with typhoid fever 483
— — *x* rays in 365
— sanatoria for 554
— of skin, source of infection 394
— surgical, open-air treatment in 316
— and syphilis of lung 433
— of tonsil 472
Tuberculous adenitis, *x* rays in 365
— empyema 459
— epididymitis, treatment 449
— glands, pepsin, hydrochloric acid, and phenol compresses in 233
— meningitis 263
Tuberosity of the tarsal scaphoid 168
Tubes, *x*-ray, safety device for 499
Tumours of bladder (*see* Bladder, Growths of)
— breast, with laryngeal paralysis 245
— cerebral (*see* Cerebral Tumours)
— of the kidney 240
— salivary glands 278

PAGE
Tumours, skin, as primary manifestation of lymphatic leukæmia 251
— of the spinal cord 299
— thyroid 466
Twins, Hirschsprung's disease in 211
— one normal, one syphilitic 436
— in pregnancy, x-ray examination 507
Typhoid bacilli added to antigonococcus serum for gonorrhœa 195
— — and phlebitis 484
— carrier, autopsy of 482
— — surgical treatment 486
Typhoid fever 481
— — epidemiology 482
— — foreign proteins in 303
— — gas gangrene in 484
— — infantile 482
— — with malaria 483
— — and peritonitis 483
— — with phthisis 483
— — prophylactic inoculation 484
— — — — complications following 485
— — not protean 482
— — Rodet's serum in 485
— vaccine benefiting gonococcal arthritis 305
Typhus fever 486
— — aural and laryngeal complications of 487
— — epidemiology 486
— — pulmonary congestion in 487
— — urinary complications in 238
— — urotropine in 488
— — vaccine treatment 487

ULCER of the bladder 49
— cornea, treatment 96
— in diagnosis of dysentery 23
— duodenal (*see* Duodenal Ulcer; Gastric Ulcer)
— gastric (*see* Gastric Ulcer)
— jejunal 185, 417
— of the leg, choleval in 387
— — salt dressings in 488
— pylorus, from senecio poisoning 341
— 'spontaneous' on amputation stumps 25
— tropical, x rays in 474
— varicose, ambulatory treatment 496
— of the wrist developing to glanders 188
Ulcerative endocarditis 121
— and gangrenous balanoposthitis 168
Ultra-violet light, quartz, in prostatitis 350
— radiation 120
— — and x rays in pulmonary tuberculosis 365
Umbilical-cord complications and still-birth 243
Umbilicus, ecchymosis of 116
Unconscious, criticism of theories concerning 353
Unmited fractures of neck of femur 321
— — non-specific proteins in 303
Urea, blood examination for 235
— concentration in urine 235
— and indican content of the blood-serum 237
— quinine-hydrochloride in hæmorrhoids 201
Ureter involved in bladder growths 51
Ureter, surgery of 488
— — contra-indications 489
— — stone removed by perineal route 490
— transplanted into large intestine 147
Ureteral stricture and pyelitis 488
Ureterectomy in epithelioma of renal pelvis 241
Ureteric calculus 242
— — methods of removal 189
Urethra, dilatation of, in urethritis 190
Urethra, diseases of 490
— — hypospadias 490
— — stricture 490
— — congenital valves of posterior 490
Urethral spatula, improved 527
Urethroscope tube for posterior urethra 527
Urethritis complicating cerebrospinal fever 81
— treatment 190
Urethrostomy in stricture 491
Urethrotomy in stricture 491
Urethrorectal fistula, Young-Stone operation 491
Urethrovesical irrigation in gonorrhœa 193
Uric acid theory of gout denied 373
— — in urine, how determined 492
Urinary calculus 48
— complications in typhus 238
— diastase test in cœliac disease 90
Urine in acute dilatation of stomach 406
Urine analysis 491
— — acetone 491
— — chlorides 491
— — in toxæmias of pregnancy 342
— — uric acid 491
— arsenic in, in diffuse sclerodermia 381
— colour tests of 235
— in dementia præcox 266
— diabetes 100
— dyspeptic disorders of the young 111
— examination in infant pyelitis 361
Urine, incontinence of, in children 492
— — — mental treatment 492
— — — triple line of treatment 493
— — treatment 47
— in kidney function tests 234
— own, test in tuberculous epididymitis 450
— of pernicious anæmia patients 335
— retention of, in enlarged prostate 51
— — prostatic disorders 343
Urobilin and urobilinogen in urine and stools of pernicious anæmia patients 335
Urological basin, new pattern 527
Urotropine in alopecia areata 22
— coli bacilluria 90
— pyelitis and cystitis 238
— typhus fever 488
Urticaria, etiology 389
— following antisyphilitic remedies 429
Uterus, cancer of, x rays and radium in 363
Uterus, disorders of 493
— — endocervicitis 493
— — radium in 493
Uterus, prolapse of (*see* Genital Proapse)
— treatment of, in septic abortion 19

VACCINATION 494
— case, compact pattern 528
— on inner and back side of arm 494
— in Kaffir-pox 395
— neglect of, causing increase of small-pox 395
— stations, educational 566
— of tongue 495
— trichophytosis complicating 495
Vaccine therapy in alopecia areata 22
— — bacillary dysentery 110
— — bubo 85
— — cerebrospinal fever 82
— — chorea 88
— — chronic prostatitis 349
— — coli bacilluria 90
— — diphtheria carriers 224
— — diseased tonsils 173
— — eczematoid dermatitis 99
— — enteric fever 484, 485
— — epididymitis 194
— — filariasis 166
— — gonorrhœa 194
— — hay fever 204
— — infant pyelitis, superseded 361
— — influenza 463
— — non-specific (*see* Non-specific Protein Therapy)
— — in peritonitis 334
— — prostatitis 194
— — retinal hæmorrhages 151
— — sycosis 421
— — typhoid fever 481, 484
— — typhus fever 487

PAGE
Vaccine therapy in whooping-cough .. 498
Vaginal operations in genital prolapse 186, 187
Valves, congenital, of the posterior urethra 190
Varicella (*see* Chicken-pox)
Varicocele, operative treatment 449
— pelvic (*see* Pelvic Varicocele)
Varicose ulcer, ambulatory treatment .. 196
Varicose veins 195
Variola (*see* Small-Pox)
Varioloid varicella 395
Vascular surgery 497
— — arteriovenous aneurysm 497
— — ligation of the carotid artery .. 497
Vas deferens, injections in, in seminal vesiculitis 384
Vasenol in intertrigo 228
Vaseline, iodoformized, in bubo 85
Vasomotor rhinitis, olfactory 204
Vean and Ruppe's operation for hare-lip .. 202
Vegetable diet in acne vulgaris 20
— — diabetes.. .. .. .. 101, 102
Veins of neck in diagnosis of goitre 167
Venereal disease, fourth 168
Venesection in pneumonia 338
— as preventive of intra-ocular haemorrhage 75
Ventilation in x-ray rooms essential.. .. 364
Ventriculography 298
Vernes' test in syphilis 422
Version, eliminating second stage of labour.. 243
Vertebra, 5th lumbar, sacralization of .. 501
Vertebral bodies, compression fracture of .. 396
Vesalius, bone of, abnormal ossification at .. 505
Vesical calculus in a typhoid carrier.. .. 331
Vesico-intestinal fistula 50
Vesiculitis, seminal (*see* Seminal Vesiculitis)
Villard's technique in cataract operations .. 75
Vincent's angina in leukæmia 250
Violet-ray high-frequency generators .. 528
Viper bites, ligature in 396
Visceral syphilis 433
Vision impaired by methyl alcohol poisoning 339
— improved by shifting the eyes 157
Vitex peduncularis in blackwater fever .. 17
Vitreous affections, sugar injections in .. 161
— early escape of, in cataract operations .. 77
— shrinkage of, causing detachment of the retina 372
Volvulus of the stomach 105
Vomiting in gastric ulcer 112
Von Recklinghausen's disease 498
Vuzin in gonorrhœal rheumatism 196

WALKING-STICK and crutch combined 529
'War endocarditis' 122
— hyperpiesis, treatment 39
— tetanus during 151
— typhoid fever during 482, 481
Warts, inoculation causing 498
Wassermann reaction in congenital syphilis 443
— — heart extract and cholesterol in .. 511
— — in malaria 258
— — in pernicious anæmia 335
— — significance of a persistently positive, in syphilis 422
Water and chlorides test for kidney function 234
Waterproof coverings causing intertrigo .. 228
West Indian modified small-pox 395
Wheeler's method for abduction and extension of arm 67
Whisky substitutes causing poisoning .. 339
Whitehead's operation for hæmorrhoids 201, 202
'White-line' test in hypo-adrenalism .. 134
Whitman's operation in ununited fractures of femur neck 324
Whooping-cough 498
— benzyl benzoate in.. 510
— duration shortened by diathermy .. 498
— ether in 498
Whooping-cough, vaccines in 498
'Wilkinson' cure in scabies 376
Wishes and desires in current psychology .. 354
Witte's peptone in asthma 304
Wood-spirit poisoning 339
Worms, intestinal (*see* Ascariasis; Oxyuris)
— — in enuresis of children 492
Wounds, diminished incidence of tetanus in 451
— treatment by foreign proteins 303
Wright's solution in acute otitis media .. 112
Wrist and fingers, treatment of burns .. 67
— ulcer of, developing to glanders 188

XANTHOMA, multiplex, blood findings in 994
— x-ray diagnosis 505
X-ray apparatus 499
— — Bucky and moving-grid diaphragms.. 503
— — improved plates 499
— — radiometric 529
— — renal compressor 530
— — safety device for tubes 499
— — screening stand, improved 530
— — tube box with standard and couch .. 530
— causing acute plastic anæmia 363
— control in pituitary surgery 336
X-ray diagnosis
— — appendix 501
— — bladder growths 54
— — bones 503
— — bronchiectasis 66
— — cæcal constipation 93
— — calcification in angiomata 507
— — chest disease 141
— — congenital dislocation of patella .. 505
— — cysts of bone 505
— — diverticulitis of the colon 501
— — duodenal diverticulitis 501
— — — ulcer 109
— — dust inhalation 506
— — empyema 455
— — Erb's dystrophy 137
— — eye affections 151
— — gall-stones 502
— — head in epilepsy 144
— — Hirschsprung's disease 501
— — hour-glass stomach 106, 500
— — infant pyelitis 361
— — kidneys 506
— — Klippel-Feil syndrome 288
— — Köhler's disease of scaphoid 504
— — Kuemmel's disease 397
— — linitis plastica 500
— — liver 502
— — lungs 66, 161, 506
— — megaduodenum 501
— — myotonia congenita 137
— — nasal sinusitis of children 285
— — neurological surgery 298
— — œsophagus 499
— — pneumoperitoneum 502
— — pregnancy 507
— — prostatism 344
— — pseudo-coxalgia 322, 504
— — renal tuberculosis 239
— — sacralization of 5th lumbar vertebra 501
— — supernumerary bones of foot .. 505
— — surgery of the stomach 112
— — syphilis 505
— — teeth 507
— — tuberculosis in bones and joints .. 503
— — ulcer of the stomach 500
— — ureteric calculus 489
— — xanthoma 505
— effect on eyes 96
— — fœtus in utero 366
— pathology 507
X-ray therapy (*see also* Electrotherapeutics; Radiotherapy)
— — in acne vulgaris 20

PAGE

X-ray therapy in adenoids 366, 472
— — cancer 70, 362
— — — of the breast 65, 387
— — — choroid 154
— — — skin 386
— — — larynx 246
— — cervical adenitis 254
— — Darier's disease 96
— — diabetes 103
— — diseased tonsils 472
— — eczema 119
— — epithelioma 391, 393
— — Graves' disease 132, 366
— — Hodgkin's disease 212
— — in enlarged prostate 366
— — improved technique 362
— — in interstitial keratitis 366
— — leukæmia 251
— — lichen planus 252
— — protection of workers 363
— — in pruritus ani 351
— — pulmonary tuberculosis 365
— — and radium, relative value 365
— — to reduce size of spleen 398
— — — in uterine cancer 363
— — in ringworm, inferior to radium 366, 375

PAGE

X-ray therapy in sarcoma testis 448
— — summary of results in ordinary diseases 365
— — in sycosis 424
— — tonsillar diseases 366, 472
— — tropical ulcer 474
— — tuberculous epididymitis 449
— — — lip 394
Xylol, iodoformized, in bubo 85

YELLOW colour of cerebrospinal fluid .. 84
Yellow fever 508
— — parasite and dengue 98
— oxide of mercury ointment in trachoma 474
— — ointment in phlyctenular ulcers .. 96
Young-Stone operation in urethrorectal fistula 491

ZINC ionization in chronic otorrhœa .. 114
— — local sepsis 120
— oxide, etc., in varicose ulcer 497
— powder in erythrœdema 150
— salts in snake bite 396
— sulphate in conjunctivitis 154
— — urinary incontinence 47

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THE MEDICAL ANNUAL, 1922

A Review of the Year's Work in the Treatment of Disease.

INTRODUCTION

BY THE EDITOR.

In an article which we think our readers will peruse with interest and pleasure, Sir W. I. de C. Wheeler writes on *Surgery, the Advance of.* We think much of what he says applies equally to medicine and the whole range of research connected with both subjects. He says: "If not from day to day, at all events from year to year, the outlook of the operating surgeon must alter. It is no use when young deciding what is best in surgery and developing to the utmost a system based on the work of contemporary leaders in the belief that it will suffice for a lifetime. Think of the manufacture of motor cars, and compare the engines of to-day with those of ten years ago; the small improvements in carburettor, magneto, and essential parts have in a decade produced an almost perfect machine. The danger is that as we grow older, and our minds less receptive, we may miss in surgery the cumulative effect of small advances. We learn another lesson by noting the incredulity and scathing disbelief, the merciless and destructive criticism, which accompanied such epoch-making discoveries as anæsthesia and antiseptic surgery." He also remarks that the art of surgery is now so wide that no man can expect to be expert in all branches, and yet a knowledge of all branches should, in the interests of science, be brought to bear on almost every surgical or medical case.

We very fully appreciate the value of Sir W. I. de C. Wheeler's opinions, because it is from this point of view that we have for so many years edited the Medical Annual. Possibly there is much in every volume that is chiefly of interest to the specialist and the expert; but no matter which branch of medicine or surgery the practitioner may follow, it is necessary that he should know or have at his command the work being done in other departments, because each may cast light upon the other. And as he truly remarks, the small improvements and advances made year by year have the cumulative effect upon the whole machine and its efficiency. Both in medicine and surgery there is a greater receptivity to newer methods than existed in a previous generation, and less tendency to destroy discoveries by "merciless and destructive criticism".

Another distinct advance in efficient methods of treatment is dealt with by Mr. E. W. Hey Groves in his article on *Orthopædic Surgery.* He truly says: "The great advance which operative surgery has made in the last generation, particularly in the field of the abdomen, has tended to convert the surgical wards of our hospitals into mere annexes of the operating theatre. Injuries and diseases of the spine or limbs may or may not require operative attack, but they all demand long-continued observation, an accurate knowledge of appliances of all sorts, and many special methods directed to the restoration of function." He pleads therefore for special departments of hospitals devoted to orthopædic work, and for surgeons and nurses trained in this particular branch. We may add that this is also true of cases described as chronic rheumatism and arthritis, who, even if they are lucky enough to secure a bed in a hospital ward, are allowed to drift into hopeless incapacity because of the belief that nothing can be done for them. The method of the orthopædic department, together with efficient medical treatment, can not only prevent this incapacity, but can cure the majority of those whose limbs have been allowed to become flexed and distorted until the patient has become a burden on society.

Readers of Mr. Hey Groves' article will see how much can be done even in cases of infantile paralysis and congenital dislocation of the hip. In the discussion on the treatment of scoliosis, we think insufficient attention has been paid to breathing exercises in the treatment of this condition. Personally we have found that the effort to develop the affected muscles secures a considerable impetus if the patient can be caused to expand the lungs fully. In fact, in early cases chest-expansion exercises alone, if properly performed, are often sufficient to effect a cure.

Under the title *Endocrinology*, Dr. Langdon Brown brings under review the great advance of knowledge which has been made respecting the endocrines and their biological relationship. To some extent every product of cell activity has an effect on every other tissue; "but for the most striking influence on metabolism we must look to the specially elaborated secretions, the hormones, produced by ductless and other glands. From a study of hormones and vitamins we have learned the powerful effect of even infinitesimal doses". The functions of the ductless glands are profoundly affected by the loss of vitamins—perhaps this may be the way in which vitamins exercise their control.

The secretory activity of the ductless glands is greatly increased by any cause which raises the body temperature. This is interesting in connection with the fact that it has been recently shown that by artificially raising the body temperature daily there is usually an increase of the body weight, in spite of the sweating produced.

Attention is called to the value of quinine hydrobromide in *Graves' disease*; in fact, the tolerance of the drug may be regarded as a test for hyperthyroidism. Doses of 10 gr. can be given three times a day, without producing the symptoms which would be likely to follow in a normal individual. While Dr. Langdon Brown regards it as the most valuable drug we possess in these cases, he finds it is not always well tolerated by women. Barker, describing the *x*-ray treatment of the thyroid gland, says that it should not be used for simple goitre or adenomatous enlargement, because it acts first on the secretory cell and will cause hyperthyroidism before reducing the tumour; but he warmly advocates it for Graves' disease. In respect to *thyroid insufficiency*, attention has been called to such symptoms as relaxation of the articular ligaments, particularly of the knee, ankle, and heel. Infiltration of tendons and fasciæ may produce the rheumatoid pains.

X rays, both for purposes of diagnosis and treatment, constitute one of the advances of medicine and surgery to which we have grown accustomed; but, as will be gathered from Mr. Thurstan Holland's articles (*Electrotherapeutics*, *Radiotherapy*, *X-ray Diagnosis*), the methods and appliances are undergoing steady improvement, like the motor car to which Sir W. I. de C. Wheeler alludes. There has perhaps been a tendency to rely too much upon *x*-ray photographs in the diagnosis of cases which require also the skilled physical diagnosis of the physician and surgeon for their complete elucidation. This is specially marked in cases of joint disease; no picture of a joint at rest can give the information which can be obtained by examining the joint in motion. It is after such an examination, and not before, that the *x*-ray photograph can help us in our diagnosis.

The most important advance in radiotherapy during the year has been the Erlangen technique in the treatment of malignant disease. This provides a much stronger current than has formerly been available. By means of a special apparatus, working at a 16-inch spark-gap with 2 to 2·5 ma. passing through the tube, filtered by ½ mm. of zinc, a practically homogeneous stream of *x* rays results. A measured dose of the stream will definitely kill cancer-cells. Anything short of this dose, which must be administered at a single sitting, is useless, and indeed dangerous, for the smaller dose acts as a stimulant to the cells instead of as a destructive agent. Dr. Thurstan Holland gives details of the technique, and his article also contains some valuable suggestions as to the best method of protecting the *x*-ray workers who are dealing with these potent currents.

The combined treatment of cancer of the breast by radium and massive doses of *x* rays appears to have given excellent results. It is claimed that it intensifies the natural reaction of the tissues to carcinoma while producing in addition a very strong destructive action on the tumour-cells. It is said to seal the lymphatics, and invisible vagrant cells are incarcerated or destroyed. (*Breast, Cancer of.*)

In the article *Cancer* it is pointed out that radium gives the best results in growths with an active circulation. It probably acts on the cell nucleus and checks division. *X* rays act upon the protoplasm of the cell and check growth. They may destroy the controlling granules of the cell, and the cell will become malignant if surrounded by its proper biochemical fluids. Thus cancer can be not only produced but controlled. That an acid medium favours the growth of cancer, and that the administration of alkalis is beneficial, are views which are steadily gaining ground.

In an article on *Non-specific Protein Therapy* Dr. Herbert French deals very fully with the difficulty we have in explaining the action of those vaccines which have no specific relation to the disease.

He tells us that "there has been for a time a tendency to regard most kinds of vaccine treatment in particular, but also certain types of serum treatment as well, as essentially specific. It is becoming a little doubtful, however, whether the results do depend, as was at one time thought, upon anything so very specific in the vaccine or sera employed; it is at any rate emerging that a non-specific vaccine may sometimes be helpful—and not merely helpful but almost as good as, or even better than, a specific vaccine—in the treatment of particular maladies". He instances that anti-influenzal vaccine administered as a prophylactic benefited certain cases of rheumatism; that gonococcal affections can be benefited much by injections of typhoid vaccine.

In an article which our readers will peruse with interest and pleasure, he endeavours to find some rationale for the action of these and other non-specific proteins. He suggests that "the patient, when he thus receives the unexpected and strange protein into his blood-stream, reacts throughout his body tissues, producing anti-protein substances which did not exist there before, and thus, as a side-issue, produces chemical changes or substances which happen to be inimical to coccal or other infections of his fibrous tissue or joints".

Percy Wilde also suggests that the administration of vaccine may be regarded as a form of pyretic treatment when a decided reaction is induced. Until proof can be given to the contrary, he is inclined to attribute any good results attained to the fever produced, rather than to the nature of the vaccine which caused the reaction.

As fever liberates lactic acid from the tissues, he claims that all agents and methods which raise the body temperature are beneficial in rheumatism.

In Lieut.-Colonel Lister's article on *Cornea, Diseases of*, there are some useful hints respecting the treatment of phlyctenular ulceration. All sugars and starch foods should be removed from the diet, and meat, eggs, and oatmeal given. One drop of argyrol, sol. 1–4, is instilled every four hours, and the ulcer is dusted with finely-powdered calomel once daily. It is also suggested that yellow-oxide ointment be applied once daily on the under surface of the upper lid, and continued for a week after the ulcer has healed. In the article *Eye Affections, General*, he records David's opinion of the value of zinc sulphate (1 per cent), to which is added usually 5 per cent of a solution of adrenalin chloride (1–1000), in the treatment of *conjunctivitis* and for preventing the attacks.

In the same article the influence of the cinema on *eye-strain* comes under consideration. The conclusion reached after careful inquiry is that it is due to the eyes of the spectators being directed upward at an abnormal angle, and that this causes fatigue of the eyes. When the observer is so seated that the direction of the eyes is horizontal or downward, there is no strain upon the eye. The seats to avoid are those which are either too near, or too far back, or at the side of the hall.

Snow blindness is attributed to rays from the violet end of the spectrum; for this reason red and amber glasses give efficient protection. Adrenalin chloride (1–1000) dropped into the affected eye has proved the best treatment.

Visual defects owing to *excessive smoking* often have the symptom that the distant vision is bad, but the patient sees better in a moderate light. He sees badly at midday when the sun is shining, and better in the evening. There is also inability to recognize small discs of red and green—the red tip of a match may be invisible.

In the article, *Eye, General Therapeutics of*, there is some interesting information concerning the value of injection of milk in *albuminuric retinitis*, also in *tuberculous affections* of the eye. One observer has used it largely as a prophylactic measure in operation cases where post-operative troubles were feared. Doses of from 3 c.c. to 12 c.c. appear to have been used, injected either into the gluteal region or abdominal wall. The patient is kept in bed until fever subsides. The rationale is not explained, but it is supposed to set free in some unknown way protective powers which are present.

Sugar injections also appear to have been used in cases of *neuro-retinitis*, in vitreous affections following severe rheumatic iritis, and in iridocyclitis of tuberculous origin. A twenty-five per cent solution was used. It is suggested that this may be a valuable means of promoting the absorption of intra-ocular exudates.

Glaucoma is commoner in winter than in summer, possibly due to the contraction of the pupil in a bright light. For this reason the wearing of dark glasses, by diminishing the contraction of the pupil, favours the onset of glaucoma. In the case of headache in elderly people, the use of eserine is advised. If it gives relief, glaucoma may be suspected.

Dr. Stanford Read, in his article on *Mental Disease*, quotes Myerson's remark that "the term *neurosis* is regarded as a pure euphemism, for most cases of psychasthenia and hysteria are entirely mental, and as truly psychotic as dementia præcox, and much more so than general paresis". But the term has other applications, and 'neurosis' may have its origin in an asthenic condition of the nerves due to some physical cause or auto-intoxication. Therefore the practitioner must be a little careful of attributing symptoms to mental causes before other conditions have been satisfactorily eliminated. W. Boven makes some admission of this; he states that every psychosis is at the same time psychic and organic, and that these are but two aspects of the same *ensemble* of phenomena: "A toxic factor may be suspected without denying the importance of the rôle played by the primitive character in determining the clinical picture of a psychosis. The two factors are truly complementary to one another". This also may be true, but there is perhaps too great a tendency at the present moment to lay undue stress on the mental factor. Thus a healthy man with a well-balanced and intellectual brain may be brought to a condition of melancholia, and actually commit suicide, because his tissues are saturated with an acid which he cannot eliminate. In such cases recovery from the neurosis takes place as soon as there is active elimination.

In *moral imbecility*, dealt with in the same article, we may have intelligence without wisdom, and by lack of wisdom is meant failure of the sense of rightness or wrongness in the acts performed, the incapacity to form a judgement as to their ultimate effect, and the inability to co-ordinate conduct to an ultimate advantage. The German definition of moral imbeciles is, "Those who do not possess the power of considering the results of their actions". The true imbecile is no fool. Under the Mental Deficiency Act he is defined as a "person who from an early age displays some permanent defect, coupled with strong vicious or criminal propensities". We are not quite sure whether in many cases there is some permanent defect which can be described as existing from an early age; and the imbecility does not always show itself in the form of vice or criminal acts. These cases present great difficulties as regards treatment. They always do best when under discipline, either at school or in the army.

Dr. J. A. Hadfield's article *Psychological Medicine* gives an excellent résumé of recent contributions. He gives a good definition of the point of view taken by the modern school: "The psychologist reduces all the events and occurrences of the objective world into terms of mental processes, discards the old idea that a breakdown can be due to a 'shock', but regards it as always due to an endopsychic conflict between the dominant psychology and a repressed complex of fear, sexual desire, or ambition aroused by a shocking event. This is not a mere academic distinction, for it means that in analyzing the condition we need to reproduce not only the forgotten event, with its emotional content, but both the antagonistic emotions which produce the conflict". As an illustration of the psychological point of view, we may take the first part of the article, which deals with insomnia. Much is told us of its psychological causes, but we are left rather in the dark as to what to do in the everyday case. A common form of insomnia is when the patient wakes at a particular hour each night. This we are told "is a habit, but beneath every habit lies a repression. Analytical investigation always demonstrates that the habit of waking, say at three o'clock, dates back to some forgotten event occurring at that time—e.g., the time when a patient discovered he had dysentery in the Dardanelles". The more materialistic physician would never have thought of this. He would think that the patient woke up because his stomach was empty. He would probably tell the patient to take some food on first waking, or a light meal on retiring to rest. Perhaps it is because so many practitioners are materialistic that they are out of sympathy with the introspective patient, or perhaps it is because he takes up too much time. If by psycho-analysis we encourage patients to be introspective and to attach too much importance to their emotions, it is a question whether they are mentally better even if they have lost some particular symptom. Dr. Hadfield tells us, "Neurosis is due to the fact that one segment of the autonomic system makes the whole organism subservient to it". This seems a reason for not attaching too much importance, so far as the patient is concerned, to this one segment. The treatment by 'suggestion' as advocated by Baudouin appears to stand upon another footing. The wise practitioner uses suggestion consciously or unconsciously. He does not ask the patient to repeat the formula, "In all respects I am getting better day by day"; he has less crude methods of producing the same effect.

So much attention has recently been given to blood-pressure as a symptom, that the following statement by Dr. Carey Coombs in his article *Arterial Tension* is valuable: "A sustained abnormality in pressure—one observed whenever the patient is examined—is significant; but a single high or low reading, unless it is very pronounced and clearly supported by collateral evidence, is not an adequate basis for a diagnosis". The variations in blood-pressure due to the position of the patient, either recumbent, sitting, or standing, and the effect of exercise, are called attention to by Wheelon. Another factor, we think, is the nervous excitement roused by the consultation and the application of the apparatus, in a certain class of patient. In respect to the treatment, over-eating rather than a high-protein diet is regarded as favouring high tension. Vapour and warm baths are recommended.

The injection hypothesis of *Arteriosclerosis* has led to the suggestion of bowel lavage on an extensive scale. In reference to this, Dr. Carey Coombs very wisely remarks that "more can be done to ensure longevity by conserving the vitality of the tissues (reducing to a minimum the katabolic effects of hurry and worry) than by an anxious warfare against the bacteria which infest our bodies from the cradle to the grave."

Auricular Fibrillation has formed the subject of many interesting articles, and one by Cornwall gives some excellent hints upon its diagnosis. He says: "Auricular fibrillation can usually be identified by the rapidity of the heart's action and its absolute irregularity. Often the apex beats are considerably more numerous than the pulsation at the wrist, because many of the former are too feeble to send a pulse-wave to the wrist. Any irregular ventricular rate above 120 is most likely to be auricular fibrillation." As regards treatment, quinidine has had remarkable results in a certain number of cases, and in the article some valuable hints are given as to its use. Dr. Coombs calls attention to the large-dose method of giving digitalis in auricular fibrillation—doses of 1 drachm of the tincture every four hours for one day, followed by ½-drachm dose for two to six days, may afford relief, and even save life, in a degree unattainable by the usual small dosage.

The article *Heart Disease, Pregnancy in*, contains an account of Sir James Mackenzie's valuable papers on this subject. Apart from their importance, the articles are a model of clinical methods applied to the study of disease and its prognosis. No mechanical appliance can take the place of the skilled physician who balances the symptoms and uses his judgement and experience as a guide. We strongly recommend our readers to peruse the abstract which Dr. Carey Coombs has prepared.

Rheumatism and gout have formed the subject of many theories, but none of them explain the symptoms met in everyday practice. Percy Wilde (*Physiology of Gout, Rheumatism, and Arthritis*) claims that all the theories put forward are wrong, and that there is no need for any theories at all. When we understand the normal physiological processes, we shall recognize that the symptoms of gout and rheumatism are not so much diseases as aberrations of normal functions. He has adopted a synthetic-histological method of investigating the processes of metabolism, and illustrates his results by microphotographs. Amongst many arresting statements, he claims to show that urate of soda does not exist in the body; that the so-called urates of the joints are dead cell walls which have never lost contact with the living cell, and are composed of lactophosphate of lime. He regards the uric-acid theory as founded on a series of chemical and histological blunders. Details of his investigations will be found in the article *Rheumatism and Gout*. They explain his remarkable optimism after thirty years' experience, and may tend to act as an antidote to the pessimistic views at present held.

In the articles which Sir Leonard Rogers contributes on tropical diseases, there are many points of practical value which have resulted from the clinical experience of those who have used the more recent remedies for these disorders. The experience of the author shows that in the treatment of liver abscess (*Amœbiasis*) repeated aspiration with emetine injections gives far better results than the open operation. Sir Leonard Rogers' method reduces the mortality by about one-fourth.

The value of oil of chenopodium in *Ankylostomiasis* is unquestionable, but there is a difficulty with the dosage, because this oil varies in strength and loses strength by keeping. Previous starvation lessens the efficacy of the drug, and yet it should not be given directly after food. A total of 1·5 c.c. in two doses at 7.0 and 8.0 a.m., and a saline purge at 10.0 a.m., is considered quite safe. Tartar emetic has proved the most useful remedy in *Schistosomiasis*, and an interesting point is raised by J. B. Christopherson as to its mode of action. He says it can permeate through the shells of bilharzial ova and directly poison the miracidia within them, and thinks the effectiveness of this drug in some parasitic diseases, and its failure in others, depends on whether the organisms are permeable to the drug or not.

In *Blackwater Fever*, large doses of quinine given intravenously were used with good results; but a new remedy has been tried with success. This is a watery extract of the leaves of Vitex peduncularis, an Indian plant which has long been used locally for fever. It is regarded as likely to prove a useful substitute for quinine.

In *Cholera* there is further evidence of the value of kaolin in early and mild cases. It is used in addition to hypertonic saline and permanganate. It is supposed to absorb and render inert the cholera toxins.

Sir Leonard Rogers' treatment of *Filariasis* by antimony tartrate is yielding good results. On an average twenty-six injections of a 2 per cent solution are needed to destroy completely the microfilariæ in the peripheral blood.

Whilst alkalis appear to benefit patients, no drug has yet been discovered which arrests the progress of *Jaundice* (*Infection*). In *Kala-azar*, tartar emetic appears to give the best results. It has also been used with success in the treatment of *Leprosy*.

Sodium morrhuate and sodium linate (the latter prepared from linseed oil) have done decided good in many cases of *Leprosy*. Sir Leonard Rogers states that an unirritating preparation will be made available by removal of the fatty acids.

For the treatment of *Malaria*, quinine still holds its own. Ronald Ross considers that it should be continued without a single day's omission in doses of 10 to 15 gr. a day for months, in order to exhaust the infection.

In a series of plague cases which occurred in Uganda, iodine used intravenously gave satisfactory results. This method was described in the MEDICAL ANNUAL, 1914, p. 440. The dosage and mode of preparation are given in the article *Plague*.

Some cases of *Sprue* were treated by T. R. Brown with 5 to 10 gr. of pancreatic extract and 20 to 40 gr. of calcium carbonate and lactate, three times a day, two hours after meals. Bicarbonate of soda in large doses also appears to have given good results.

From Dr. Graham Little's articles on skin disease we learn that *Acne Rosacea* is considered by Barber and Ryle to be best treated by acid hydrochlor. dil. in doses of 30 min. and upwards after meals, or sipped with the meals. The importance of green vegetables, stewed fruits, and aperients is insisted upon by Highman in the treatment of *Acne Vulgaris. Alopecia Areata* is said by Barber to be due to a bacterial protein, usually of *Streptococcus pyogenes longus*, absorbed from the teeth, tonsils, and the nasopharynx. Pure carbolic and lysol are recommended as local applications.

In *Carbuncle*, sulphur internally is recommended, and good results are also claimed from the use of collosal manganese by intramuscular injection. For erysipelas the part is painted, to well beyond the margin, with a 5 per cent solution of brilliant green once or twice a day. Personally we have found a solution of ichthyol 1–4, applied in the same way, to have almost a specific effect. As a method of softening *Keloid*, and scar tissue of burns, etc., compresses have been used soaked in the following solution—Pepsin 10 grm., hydrochlor. ac. 1 c.c., phenol 1 c.c., distilled water 200 c.c.

Unna regards *Psoriasis* as in no sense a constitutional disorder, and thinks it approximates more to the fungoid group. He regards it as most likely to attack regions which are fat-free, and that chrysarobin and cignolin act as excitants of oleic acid. Some excellent formulæ are given in the article. For *Rhus Dermatitis* an intramuscular injection of Rhus toxicodendron is recommended, the alcoholic extract being used. A single injection is usually sufficient.

An ambulatory method of treating varicose ulcer is described in the article *Varicose Veins*, and should prove of great value in these cases when prolonged rest is impossible. This is one of the common difficulties in everyday practice, and its solution is of great importance.

The proportion of fat in the diet of diabetics is still under discussion. In Dr. John D. Comrie's article on *Diabetes* Dr. Cammidge is quoted as stating that while a healthy person requires only about one part of sugar for the complete combustion of three parts of fat, in the diabetic one part of sugar will burn off one and a half times or twice its weight of fat. On the other hand, Newburgh and Marsh have shown that it is possible, without acidosis or loss of weight or vitality, to keep patients for long periods on a high fat, low protein, and low carbohydrate diet. They claim that a high fat diet will keep the patient sugar free, prevent the occurrence of severe acidosis, maintain his nitrogen balance, and enable him to resume his ordinary activities of life. They regard as fallacious the common fear that fat in a diabetic diet is productive of acidosis. The same writer contributes a useful article summarizing the present condition of *Kidney Function Tests*.

The relative value of medical and surgical treatment of *Gastric and Duodenal Ulcer* has been under further discussion during the past year. In Dr. Robert Hutchison's article there is a report of a large number of cases treated at the Battle Creek Sanatorium. The medicinal treatment consisted chiefly of the use of Sippy's method described in our last issue. The average duration of treatment was five weeks. In 156 cases treated medically, and in which a period of at least three years had elapsed since the disappearance of their symptoms, 113, or 72 per cent, reported no return ; and 43, or 28 per cent, had recurrences. Marked pyloric stenosis which fails to yield to medical treatment, and frequent hæmorrhage, are regarded as indications for surgical treatment.

In respect of the fear of malignancy, Wilensky says that less than 2 per cent of gastric ulcer become malignant.

The surgical treatment of gastric and duodenal ulcer is very completely reviewed by Mr. James Sherren (*Stomach, Surgery of*). As regards the methods advocated, he says : "No standardized operation can be performed for all cases of ulcer ; but so far as chronic duodenal ulcer is concerned, at the present time gastrojejunostomy gives such excellent results that it should not be lightly displaced on theoretical grounds until cases treated by other methods, traced over a number of years, have proved to be as satisfactory." This operation is also recommended in cases of perforating gastric or duodenal ulcers, whether acute or chronic. In respect to the diagnosis of suitable cases for operation, Devine's views are of interest. He says it is not generally recognized that the vast bulk of apparent stomach disease is functional or reflex. Extrinsic disease simulating a stomach lesion can generally be cured by an operation : its elimination is not therefore so important. An exploratory operation for any of the many forms of neuroses of the stomach which are so easily confused with organic disease will be a misfortune : the patient will be constantly reminded by the persistence, perhaps exacerbation, of the symptoms, that a useless and perhaps harmful operation has been performed. Mr. Sherren endorses these statements.

Devine considers careful study of the clinical history most important. A negative result from a test-meal and a skiagram may be wholly misleading without careful physical examination. While vomiting may occur in gastric ulcer ; yet when this or a hæmatemesis is the main symptom, gastric ulcer is usually not found. Both Moynihan and Sherren lay much stress on this point. The former says : "When in the record of any patient suffering from dyspepsia there is a story of frequent vomiting or of the inability of the stomach to tolerate the presence of any foods or even fluid nourishment, the thought that gastric ulcer is the cause should be driven from one's mind."

In the same article there is a note on the treatment of *acute dilatation of the stomach*, which is apt to occur after operations. All experience favours the prone position with the hips raised, the passage of the stomach tube as often as necessary to keep the stomach empty, and the replacement by rectal salines of fluid lost.

Dr. E. Wyllys Andrews gives some very emphatic cautions to be observed in the treatment of *Appendicitis*. One is that in all cases of either appendicitis or peritonitis, the administration of food and cathartics by the mouth should be absolutely prohibited, and large enemata never be given. This rule must be followed until the patient has been free from pain and otherwise normal for at least four days. At the beginning of treatment not even water should be given by the mouth ; the mouth should be merely rinsed with cold water ; later, small sips of very hot water. He speaks highly of the use of the continuous normal salt solution given per rectum by the very slow drop method.

In the article *Colon, Surgery of*, he speaks of cancer of the large bowel as the most benign form of cancer in the body, because metastases are few and late, and recurrence after operation is uncommon. For this reason early diagnosis is very important. He gives some helpful diagnostic symptoms which may enable the practitioner to recognize it at an early stage.

The question of drainage in operations on the gall-bladder has been the subject of much discussion during the year. Dr. E. Wyllys Andrews (*Gall-bladder, Surgery of*) says that "only in the presence of a chronic or mild form of infection can drainage be omitted"; but this includes a very large percentage of cases. He does not pack in most cases, but inserts a small folded guttapercha strip and removes it in three or four days.

On the other hand, in severe cases of *Peritonitis* (q.v.) the importance of draining the intestine is becoming recognized. Drainage of the peritoneum is of doubtful value; but when the intestine is drained, vomiting is relieved. With the discharge of the toxic duodenal contents a great improvement in the general condition is noted.

Injection treatment for piles formed the subject of a special article in the ANNUAL, 1916, by Dr. James Searson, and we have often wondered why such a simple and efficient treatment was not more generally adopted. Mr. Lockhart-Mummery (*Hæmorrhoids*) speaks very favourably of this method. He suggests a solution of carbolic acid and glycerin containing 20 per cent of carbolic. He says: "If properly done, it is free from risk and does not in any way incapacitate the patient during treatment." From long experience of this method of treatment, the writer finds it most suitable for piles which are well within the sphincter; external piles, if likely to be gripped by the sphincter, are more likely to give pain after injection, and in these cases we find the recumbent position for a few days an advantage. Urea-quinine-hydrochloride has been recommended instead of carbolic, but our own trials with this agent were most unsatisfactory. Mr. Lockhart-Mummery says that recurrence after six months or a couple of years is the rule rather than the exception.

In the treatment of *Pruritus Ani* Mr. Lockhart-Mummery advocates the use of lotions rather than ointments. In severe cases, not yielding to local treatment, he recommends Ball's operation and division of the nerve. A number of valuable formulæ for lotions and applications useful in these cases are given in the article.

The same writer also calls attention to the very great importance of the early recognition of cancer of the rectum. Whenever this is done it may be regarded as a curable disease, because the rectum can be entirely removed (*Rectum, Cancer of*). In inoperable cases the writer has seen both the symptoms relieved, and life prolonged, by the use of Chian turpentine given in a pill to which a quarter of a grain of ext. opii has been added. In the article *Rectum, Prolapse of*, Mr. Lockhart-Mummery describes his own operation for the cure of this condition, and the successful results which have followed it.

Hypertrophy of the cerebellum is one of the causes of *Epilepsy*, and it has been suggested that we might incise the dura mater of the tentorium and thus relieve the pressure on the parts of the brain in the posterior cranial fossa. It would be necessary to be sure of one's diagnosis before attempting such an operation! Another method of treating epilepsy is extirpation of the adrenal. It is claimed that nine patients so treated showed marked benefit. Attention has again been called to the value of sodium biborate in epilepsy. The most satisfactory results appear to have been obtained when given in combination with bromide of potassium. It appeared possible to reduce the quantity of sedative, while the number of attacks diminished.

Dr. Ramsay Hunt has given us a very instructive article on *Hydrocephalus* and the diagnostic methods necessary for efficient treatment. The description is illustrated by some excellent plates which help us to understand the causes of the condition and the possible assistance to be derived from operative treatment.

In an article on *Infantile Paralysis* attention is called to the necessity of rest during the early stage, and the avoidance of sitting or walking for two or three months after the attack. Exercise and massage may be commenced directly the tenderness of the muscles has disappeared. Very properly we are warned against fatigue. A point not noticed is the necessity of maintaining warmth in the affected limbs ; this is a great aid to nutrition.

This point about the value of warmth in aiding the functions of nerves is brought out in Dr. Ramsay Hunt's article, *Nerves, Peripheral, Surgery of.* "As a preliminary to electricity tests the part to be examined must be warmed." "The state of the muscle improves with massage, the application of heat, and galvanic stimulation." But we think that the masseur should be instructed to give the massage in such a way as to raise the temperature of the part and immediately wrap it up when he has finished. We cannot altogether agree that the massage should be "sufficiently vigorous to cause pain", because the skilled manipulator should know how to give it without causing pain. The sensitive nerve is one with a defective circulation. If we first restore the circulation it is no longer sensitive, and vigorous friction may be given without pain. This article gives very valuable directions for the treatment and diagnosis of these injuries, and is well worth careful perusal.

Prohibition in the United States has led to a large increase in cases of poisoning by methyl alcohol. In the article *Poisoning* Dr. Herbert French gives an interesting account of the symptoms and treatment. For the latter, after the use of the stomach tube, bicarbonate of soda is given in large doses. In the same article Professor Brauer's method of treating morphine poisoning by the insufflation of oxygen is described. Rubber tubing is a possible source of poisoning. It appears that a large amount of red rubber contains antimony pentasulphide as a filler, and antimony in almost emetic doses has been extracted. The glaze of pottery ware has also come under suspicion. It was found that a 1 per cent solution of citric acid, when boiled in certain casseroles, took up an appreciable quantity of lead, and lemon-juice also became contaminated.

In Dr. O. C. Gruner's article on *Acetone in the Breath*, the advantage of estimating it from the breath rather than the urine is pointed out and the method explained. In cases of recurrent vomiting the estimation of the acetone in the breath gives better results.

In cases of malignant disease the blood has a high sugar value, and cancers and sarcomas grow best in this medium. A high sugar value is also found in diabetes, nephritis, tuberculosis, and thyroid disease. (*Blood, Chemistry of.*) Pesci has found 30 per cent of carcinoma cases to give a positive Wassermann reaction, but this reaction disappears after repeated doses of radium. (*Cancer, Clinical Pathology of.*)

Gastric Analysis forms the subject of an interesting article by Dr. Gruner. The study of fractional analysis has been much advanced during the year, and has added to our knowledge of the functional powers of the stomach. It is found that the secretory and motor powers of the stomach vary much in different persons, and the fractional test-meal gives results that serve rather for arranging the cases into various groups than for individual diagnosis. Dr. Gruner gives a series of test-meal charts, and details of the method of analysis. In other articles he gives liver function tests, pancreas function tests, respiratory function tests, and thyroid function tests.

In Dr. Gruner's article, *Throat, Bacteriology of*, the well-known fact of the large number of bacteria which can be found in the healthy throat is mentioned. We may have streptococci, pneumococci, meningococci, hæmophil bacilli, diphtheria bacilli, and diphtheroids. We are well aware of this, since it is quite common to have cases with all the clinical symptoms of follicular tonsillitis pronounced diphtheria, because the bacillus has been discovered by a bacteriologist who has never seen the patient. The clinical knowledge of the physician is a factor not always to be displaced by bacteriological findings. In regard to the vaccine therapy of influenza, it appears to be agreed that vaccination does not prevent the incidence of colds, and that the only advantage of the procedure is that pneumonia is less likely to supervene in a vaccinated person. The mucous secretion of the throat is regarded as of defensive value against infections, and when this is deficient there is lack of immunity to colds as well as a likely factor in the production of gastric ulcer. It is doubted whether the organisms in the throat are the source *per se* of the diseases attributed to them.

Protein sensitization is a frequent cause of bronchial asthma, and eczema, urticaria, and angioneurotic œdema have a definite relationship to the protein-sensitive asthmatics. Piness states that it is possible with cutaneous tests to determine the etiology of bronchial asthma in from 47 to 50 per cent of cases (*Asthma, Bronchial*).

Hay fever being frequently due to animal emanations, cutaneous tests should be made of the common kinds of animal epidermis. Perennial hay fever is frequently caused by the ingestion of foods and by the inhalation of the cereal grain flours, and cutaneous tests often reveal such a cause, and then omission of the particular protein is the indicated treatment (*Hay Fever*).

In Dr. Latham's article on *Pneumonia* the claims put forward for camphor as a remedy are stated. It stimulates the heart, has a bactericidal action on pneumococci, comforts the patient, lowers temperature, and diminishes mortality. The injection intravenously of glucose in a 10 per cent aqueous solution has also been advocated. In 1200 such administrations no accident has followed. It is said to nourish the overtaxed heart muscle and assist elimination through the kidneys and the skin.

When tuberculosis attacks both the lungs and joints, the prognosis depends on which process began first, says A. Jacquemin, quoted by Dr. Latham in the article *Tuberculosis, Pulmonary*. The second process acts like a derivation or fixation abscess, diverting the disease to this second point. When the second process occurs in the lungs, these organs soon become compromised : but when the process of derivation is in a limb, it does comparatively little harm and should be encouraged rather than suppressed. Zehner regards camphorated oil as the best means of arresting profuse hæmorrhage from the lungs. He gives moderate doses of 20 per cent solution by subcutaneous injection.

Dr. Joseph Priestley tells us that too much stress should not be laid upon the infectivity of tuberculosis. He says (*Infectious Diseases Prevention*) that the vast majority of people at one time or another are affected by tuberculosis, but a very large proportion of these recover without permanent injury, and even without the disease ever having been diagnosed at the time of the attack. 'Open' must be strictly differentiated from 'closed' tuberculosis from the point of view of infection and the taking of preventive measures.

Sir John Thomson Walker, in his article on *Bladder, Growths of*, alludes to a recent report that refers to the relation of these growths to work in aniline factories. The products which are suspected are all amino compounds, and they enter the body through the respiratory organs, the alimentary canal, skin, and mucous membrane. Special precautions are described which are undertaken to protect the workers from becoming poisoned while at work.

Sir John Thomson Walker's article on *Prostate, Surgery of*, contains many valuable hints as regards both medical and surgical treatment. The value of instrumental treatment in cases of retention from prostatic enlargement is explained, and it is shown that it is not a simple means of overcoming a difficulty, but is a treatment in itself. The relation of blood-pressure to prostatic obstruction has also formed the subject of some interesting and instructive observations. The indications for operation, the after-treatment, and the operation itself, have all been elucidated by recent investigations, and the article is very informing.

Amongst the numerous injections which have found favour in the treatment of *Gonorrhœa*, acriflavine, 1–4000 in physiological saline, is claimed as the best for purposes of irrigation. Some discussion has taken place in reference to Colonel Harrison's method of urethrovesical irrigation which he recommends from the first day. Colonel Harrison considers that this method ensures the canal being properly washed out and can do no harm. Some interesting facts concerning gonorrhœal rheumatism appear in the same article. It seems that the proportion of patients whose tissues are invaded by the gonococcus and whose joints become affected is 1·75 per cent. Dufour and Debray adopt a novel method of treatment: they aspirate the fluid and inject it subcutaneously. They claim rapid relief of pain from this procedure, and the temperature gradually subsides. W. Mobitz claims excellent results from puncture of the joint and irrigation, followed by injection of a solution of vuzin (a derivative of the bark of Rimija cuprea), 1–5000.

Colonel Harrison's article on *Syphilis* contains valuable information both as regards diagnosis and treatment. The value of silver-salvarsan, and the necessary technique in its administration, are well brought out in a quotation from Dr. C. M. Walson. Arsenobenzol is regarded as an excellent prophylactic in patients who have been exposed to infection likely to result in syphilis, and also during the incubation period. MacKenna warns us against undue optimism over a negative Wassermann reaction after treatment. He considers that every case should be kept under observation for three years, and, when seen first in the secondary stage, for four years. The article gives a very useful scheme of the treatment he proposes. Colonel Harrison says that, since there is no absolute proof of cure, the question turns on the period during which an infected man can remain infectious to his consort, and an infected woman to her offspring. The infectivity of the man usually ceases after four or five years ; a woman remains capable of transmitting the disease to her offspring for very many years, and if marriage takes place she should have continual treatment, at any rate throughout each period of gestation.

In the article *Syphilis, Congenital*, the remarks of H. Morley Fletcher are recorded respecting the association between syphilis and tuberculosis. He says that in tuberculous cases in which the family history is suggestive or stigmata are present, the Wassermann test should be performed. Treatment of syphilis may cause much more rapid improvement of the tuberculous lesion than is possible without it.

In an excellent article on *Urine, Incontinence of, in Children*, Sundell gives some excellent advice on the treatment of these cases. The child should be watched at night, and the time determined as to when the enuresis takes place. He says that it will be found to be constant. The child should be waked a quarter of an hour before the time when it is due. Of remedies, he suggests arsenic combined with strychnine in moderate doses.

The treatment of septic abortion has been under discussion, and it appears to be conclusively proved that cases of abortion without fever may be safely left to spontaneous termination, the only contra-indication being severe or protracted slight hæmorrhage. Cases of septic abortion are no exception to the rule. This conclusion is well supported by the records of the Cork County Hospital in relation to cases of septic abortion. It was found that no operative treatment was advisable for these cases until they had been five days fever-free. (*Abortion.*)

The end-results of vaginal operations for genital prolapse have been much discussed. Dr. W. E. Fothergill, in the article *Genital Prolapse*, says that for all varieties of prolapse vaginal operations afford a treatment that is efficient, safe, and permanent, that does not prevent pregnancy, and that stands the test of parturition in a large number of cases. This being so, it follows that the addition to these vaginal operations of any abdominal intervention is unnecessary and therefore undesirable. He strongly protests against abdominal measures as a substitute for vaginal surgery. Mr. Lacey also considers these operations undesirable except in cases of developmental error or where certain complications exist, such as adhesions with retroversion of the uterus.

The elimination of the second stage of labour by version has again been under discussion. J. W. Potter, its great advocate, has received support from Rucker, who reports 200 cases of version by the Potter method. He was surprised at the few and insignificant lacerations, and attributed this freedom from injury to the deep anæsthesia, the modified Walcher posture, and the preliminary stretching of the vagina by the hand. The version method has led to other attempts to eliminate the second stage of labour. One is described as the 'prophylactic forceps operation'. It is described in the article *Labour*, but we are doubtful if it will commend itself to our readers.

A headache described by G. K. Abbott as *Ovarian Headache* always comes on at some time in relation to the menstrual flow, and it may be intermenstrual. It is a feature of these headaches that they never occur during pregnancy and that they disappear when the climacteric is complete. Corpus luteum in 5-gr. doses repeated three times a day appears to have given relief in these cases, but the remedy has had to be repeated for two or three months at a time.

From Dr. Blomfield's article on *Anæsthetics* we learn that there is no known drug comparable with adrenalin in efficacy to start an arrested heart or antagonize the action of chloroform. In order that the adrenalin should reach the heart, it is suggested that it be injected into a vein in the near neighbourhood. When the heart has begun to beat regularly and strongly, it is recommended that an intravenous injection of atropine should be given. Artificial respiration is maintained until the return of the circulation has been continued long enough to make it spontaneous. The intracardiac injection of adrenalin and strophanthine has also been used, the latter drug prolonging the effect of the first. One mgrm. of each drug was used.

The pre-operative administration of bicarbonate of soda has been recommended. It is said to reduce the danger of operation in shocked patients, and may act as a preventive of the development of shock. It appears that low pressure and acidosis, whether causally related to shock or not, are both present in this state.

When ether is injected into the colon for anæsthetic purposes, a very small amount of magnesium sulphate injected intramuscularly will cause a profound anæsthesia. It has been found that the addition of a small amount of magnesium sulphate to the ordinary injection of morphine increases the value of the injection by 50 to 100 per cent. It was further found that morphia gr. $\frac{1}{8}$ in 2 c.c. of a 25 per cent solution of magnesium sulphate given hypodermically twice at half-hour intervals, produced analgesia. When the treatment was adopted two hours before operation, the quantity of ether or nitrous oxide necessary was very much diminished.

Cœliac Disease is not so rare as generally supposed, Dr. Langmead tells us in an article dealing fully with the condition. Its chief symptoms are malnutrition, the passage of bulky, grey, offensive, and pultaceous stools, and general abdominal distention, with bouts of diarrhœa. From the description given, sodium glycocholate and sodium taurocholate appear to have proved helpful.

In the article *Dyspeptic Disorders in Infants and Young Children*, Dr. Langmead gives a graphic description of the nervous unrest which is a frequent cause of dyspepsia in infants. He regards hot baths and the hot pack as valuable in these cases. For young children he always regards the latter as preferable as a sedative to the nervous system. It requires but a little hot water to moisten a blanket, which is placed round the patient, and the dry blankets are rapidly applied, and then the child can rest in the mother's or nurse's arms. In the convulsions of teething, and even in cases of accidents with concussion, we know of no remedy which gives such satisfactory results.

Erythrœdema is a name applied by Swift, of Adelaide, to a condition of redness and swelling of the hands and feet in children. A careful description of the general symptoms is given in the article under this name, and the indicated treatment is described.

There is a good deal of conflict of opinion upon the advantages and disadvantages of dried milk, and the varied opinions are given in Dr. Langmead's article on *Infant Feeding.* Sir George Newman expressed the opinion that dried milk was an excellent substitute, " not for breast milk, and not for really good cow's milk, but for much of the milk on which infants are now fed ". But this does not appear to cover the fact that good cow's milk may not be bacteriologically perfect. On the other hand, we have to consider whether some of the nutritional value of milk is not destroyed by drying. We remember one case where the best cow's milk caused so much gastric irritation that the child was dying of inanition ; in this case, ordinary condensed milk was well borne, and the child became well and flourished on it.

Zerbino has treated cases of *Pyelitis in Infancy and Childhood* by rectal injections of methylene blue, using 150 c.c. of a 1–3000 solution. He claims that it has pronounced bactericidal action on the peccant organisms.

Dr. Rolleston speaks favourably of a method of *Vaccination* suggested by I. H. Goldberger, who operates upon the lower and back side of the arm. The forearm is flexed at right angles to the arm, and the vaccine is applied below a line midway between the internal condyle of the humerus and the anterior axillary line.

A new method of treating thread-worms has been devised by Loeper. It is by the use of bismuth carbonate, which he gives in doses of 2 to 10 grm. according to the age of the patient. Barrio uses a milk diet for a week before treatment, and gives a calomel purge on the third day. (*Oxyuris Vermicularis.*)

The treatment of *Whooping-cough* with benzyl benzoate, either alone or with small doses of benzaldehyde, appears to have continued to give good results. In many cases the throat has been painted with a 2 per cent solution of nitrate of silver, the result being ascribed more to suggestion than to any bactericidal effect of the remedy.

It has been found that in *Cerebrospinal Fever* there is a marked acidity of the cerebrospinal fluid, which differs from what is found in other meningeal affections. The cause of this is attributed to the ease with which the meningococcus can break down the glucose in the fluid and so form lactic acid. We doubt whether this explanation is correct, because excess of lactic acid occurs in the fluids of the body in the absence of this cause. It appears to indicate that free action of the skin would be of advantage as a means of liberating the excess of lactic acid. Observations on the reactions of the sweat would be interesting in cases of cerebrospinal fever.

Sir Wm. Leishman attributes the low incidence of enteric affections (*Typhoid Fever*) during the war to the care and thoroughness with which the general measures relating to drinking water, food protection and flies, and hosts of other details, were carried out. It would be invidious to attempt to assess the respective share in the credit attributable to general sanitation on the one hand, and preventive inoculation on the other. He states that vaccine treatment was practically abandoned in France during the later years of the war ; but although vaccines did not curtail the fever, the general condition of the patients appeared to be improved and severe complications diminished.

Intravenous injections of urotropine have been used with success in *Typhus Fever*. Adults were given 1·5 grm. and children 0·75 grm., the doses being subsequently increased to 3 grm. daily. The injections varied from one to eight, the average being three. Temperature usually fell after the second injection. The mortality was reduced from 29 per cent to 14 per cent.

C. M. Richter maintains that there is no proof that *Influenza* is caused by bacterial infection, and holds that influenza pandemics depend upon certain weather conditions for their development. In this view he follows the teaching of Hippocrates, and if he is correct we have not advanced very far. He states that an increase of pneumonia morbidity may be predicted whenever an extensive anticyclone is approaching a particular territory, and that there is a warning of a coming explosiveness of morbidity whenever the magnitude of the approaching cyclone warrants it. Russell finds that symptoms simulating an acute abdominal lesion occur with some frequency in influenza. He thinks that in most cases there is no reason for surgical interference, expectant treatment being the safest procedure.

In the article *Mumps* Dr. Rolleston calls attention to the good results obtained in orchitis by the injection of diphtheria antitoxin. Injections of 20 c.c. were made, and in most cases the parotid swelling diminished in two to four days and there was a considerable fall in temperature. It appeared to have prevented or arrested orchitic complications.

Cases of œdema of the glottis sometimes occur as secondary to *Measles*, and Arrigoni has found injections of pilocarpine of very great value ; when the heart is very weak it should be combined with cardiac tonics. He thinks the method should always be tried before tracheotomy is resorted to.

Tracheotomy has usually to be performed very hurriedly, and the after-results are not always satisfactory. Chevalier Jackson has pointed out some of the causes (*Larynx, Affections of*), and they are well worth consideration.

Mr. James Berry contributes an important article on the *Thyroid Gland* (*Surgery of*). He guides us in the selection of cases suitable for operation, and gives us a series of illustrations which are very helpful. He also contributes a very lucid description of the operations required, and some complications which may occur. The article is a distinct addition to our knowledge of the subject.

DICTIONARY OF PRACTICAL MEDICINE

BY MANY CONTRIBUTORS.

ABDOMINAL SURGERY. (*See* APPENDIX ; COLON ; GALL-BLADDER ; HERNIA ; INTESTINE, SMALL ; PANCREAS ; PERITONITIS ; SPLEEN.)

ABORTION.

W. E. Fothergill, M.D.

Treatment of Septic Abortion.—G. A. Peek[1] writes that the profession is divided into two irreconcilable factions—one holding that every vestige of the products of pregnancy in the infected uterus must be promptly and thoroughly removed ; while the other maintains that this infection is not dependent upon the mere presence of these products of pregnancy, and that their forceful removal is productive of serious and unwarranted harm to the patient. He quotes from Ries : "Cases of abortion without fever may safely be left to spontaneous termination, the only contra-indication being severe or protracted slight hæmorrhage. Cases of septic abortion are no exception to this rule. . . . They can terminate spontaneously during the fever, and the fever drops after the abortion." And from Polak, thus : "For years we have considered that curettage of an incomplete abortion which is infected is an unsafe procedure, as by the use of the curette we break through the protective leucocytic wall and spread the infection into the blood-vessels and lymphatics of the uterus and into the parametrium." And so on. Peek adheres to the conservative and expectant form of treatment, and considers hæmorrhage to be the only symptom that may demand a prompt and thorough emptying of the uterus.

D. S. Hillis[2] discusses the same question, which he says can best be answered by clinical experience. He therefore gives an analysis of 200 cases of septic abortion from the records of the Cork County Hospital. All had a temperature of 100° or more when admitted. In 100 the uterus was emptied artificially during the febrile period, and in the other 100 there was no local treatment. The cases with no local treatment had fewer days in hospital, fewer days of fever, fewer complications, and a lower mortality (1 to 3). Six months' clinical study showed that no operative procedure should be carried out in septic cases until they are five days fever-free, when they become so-called non-septic cases. The one exception is hæmorrhage that threatens life. Of the so-called non-septic cases, 40 per cent have to be curetted ultimately ; the procedure is relatively harmless in these cases, and has the advantage of stopping hæmorrhage and so shortening the stay in hospital.

REFERENCES.—[1]*Amer. Jour. Obst. and Gynecol.* 1921, April, 679 ; [2]*Surg. Gynecol. and Obst.* 1920, Dec., 605.

ABSCESSES.

Sir W. I. de C. Wheeler, F.R.C.S.I.

Morgante[1] recommends simple evacuation of cold abscesses, or aspiration followed by injection of **De-ethylized Alcohol.** He claims the following advantages for the method : (1) Reduction of pain to a minimum : (2) Rapid healing without scar formation ; (3) Fall of temperature within twenty-four hours ; (4) Inexpensiveness ; (5) Time-saving nature of the treatment.

The author of this paper makes a point of the non-bactericidal action of iodine. He believes that alcohol fixes the germs in the layers of the skin, and that, when fixed there, they are probably dealt with by leucocytes.

REFERENCE.—[1]*Policlinico*, 1921, April 11, 511.

ACETONE IN THE BREATH.

O. C. Gruner, M.D.

Higgins[1] points out the advantages of estimating the acetone in the breath, rather than in the urine. In cases of recurrent vomiting, this method is a better guide to the patient's state.

The patient breathes into a rubber bag of a litre capacity. Within thirty seconds, the air is expelled through 25 c.c. of a reagent composed of mercuric cyanide 10 grm., sodium hydroxide 180 grm., and water 1200 c.c. After shaking, 400 c.c. of a 0·7268 per cent silver nitrate solution are added. If acetone is present, a white cloud is formed, which reaches its maximum density in five minutes. A quantitative estimation is easily made by using a standard solution of acetone (about 0·02 mgrm. per c.c.) and comparing the cloud obtained in this with that obtained already. A high value for the acetone in the breath does not necessarily mean the presence of 'acidosis'.

Reference.—[1]*Johns Hop. Hosp. Bull.* 1920, Dec., 447.

ACNE ROSACEA. (*See also* Rosacea).

E. Graham Little, M.D., F.R.C.P.

Barber and Ryle[1] formed the clinical opinion that acne rosacea is most often best treated by the administration of acid mixtures, 30 min. and upwards of the **Acid. Hydrochlor. Dil.** of the B.P. well diluted with water, to be taken after meals or sipped with the meal. These clinical observations seem to be confirmed by an experimental inquiry into 12 cases of rosacea, all in women, whose secretions were tested by the fractional method of gastric analysis. In 5 cases there was complete achlorhydria, in 2 cases extreme hypochlorhydria, and in 1 of the remaining 5 there was no free HCl until after one hour. Pronounced hypochlorhydria was thus present in 78 per cent of the cases, and this series was compared with the result of another inquiry into the state of the secretion in 70 healthy adults, examined by T. I. Bennett, who found achlorhydria in only 1 of the 70, and definite hypochlorhydria in about 10 per cent. The authors consider that oral and tonsillar sepsis play a part in the factors preceding the gastric condition.

Reference.—[1]*Lancet*, 1920, ii, 1195.

ACNE VULGARIS. (*See also* Skin Diseases, General Therapeutics.)

E. Graham Little, M.D., F.R.C.P.

Treatment.—Highman[1] advocates cutting down the starch and sugar intake, and promoting intestinal function by prescribing **Green Vegetables, Stewed Fruits,** and **Aperients.** Locally he thinks that **X-ray** applications have superseded all other treatments, and recommends for the average case ten to sixteen exposures of one Holzknecht unit to the face weekly. In addition to this treatment, the patient should wash the face twice a day with a richly lathering soap, and shampoo once a week. Witherbee and Remer[2] endorse Highman's preference of *x*-ray treatment in acne to all other methods, and give their technique as follows: In order to maintain the same position throughout the exposure, the patient is placed in a prone position with a piece of lead foil, cut in the shape of a pair of spectacles, placed over the eyes and held in position by adhesive plaster, thereby protecting the eyes, eyebrows, and eyelashes. Another piece of lead is placed so as to protect the hair over the temporofrontal region. The head is then turned sidewise, having the chin as near as possible in line with the shoulders. The tube is centred over the zygoma and an exposure is given of ¼ of 1 skin unit or 1 H. of unfiltered *x* ray. The same dose is given to the opposite side. If there are numerous active lesions on the forehead, centre of face, and chin, an additional ⅛ of a skin unit is given to this area. This is done by making the patient face the tube and measuring the distance from the tip of the nose to the target of the tube.

This additional dose to the centre of the face should be given only every other treatment.

The routine dose is ¼ of a skin unit weekly to each side of the face. This should be continued for two or three weeks after new lesions have ceased to form. Usually this requires from twelve to sixteen treatments. In nearly all cases it is wise to give this regular course, even though the lesions have disappeared after the eighth or tenth treatment. If the chest and back are involved, the dose is the same as that for the face. Three areas are exposed on the back, centring the tube on the outer edge of each scapula and on the 2nd lumbar vertebra. The chest is divided into two areas, centring the tube midway between the mid-axillary line and the sternum in the 4th intercostal space. Overlapping of areas exposed may be avoided by protection with lead foil.

Recurrences seldom, if ever, take place, provided dietary régime and rational constitutional measures are maintained after a full course of *x*-ray treatment.

References.—[1]*N.Y. Med. Jour.* 1921, Jan. 22, 137; [2]*Med. Record*, 1921, March 19, 482.

ACRODYNIA.

J. Ramsay Hunt, M.D.

Examples of this unusual affection are described by Crookshank.[1] A curious epidemic, seemingly of peripheral neuritis with œdema, was witnessed by Graves at Paris in 1828. This is known to epidemiographers as acrodynia. It preceded by only a few months the pandemic of influenza of 1830, and the later and less extensive outbreaks were in similar relation to subsequent outbreaks of influenza. Acrodynia, indeed, in 1828–9 stood in precisely the same relation to influenza as did the Swedish poliomyelitis of 1887–9, and as did the encephalitis lethargica of 1917–19, and as have done many other epidemics of encephalitis, myelitis, meningitis, and neuritis. Acrodynia, it may be said, represents a neuritic type of the nervous cases and epidemics that invariably precede, accompany, or follow, in some place or places, epidemic and pandemic influenza.

The symptoms have been sometimes psychical, sometimes paralytic, myoclonic, sensory, and sometimes 'trophic', 'vasomotor', or 'sudoral'. Sometimes there has been lethargy; sometimes delirium, or mania. But in every epidemic all types have been represented, and, for every type described in each epidemic, at least one epidemic characterized by that type can be cited.

In 1918, whilst engaged at the London Hospital, Crookshank saw, during the height of the epidemic of 'encephalitis lethargica', two cases that he at once connoted with the epidemic. One was that of a young woman whose illness commenced with formications, and with blebs on the hands, proceeding to gangrene, and who died of an ascending central myelitis; this case recalled forcibly the sixteenth-century epidemics. The other, that of a child with crural peripheral neuritis and œdema, recalled with equal force the accounts of acrodynia.

Recently Hanns has reported a "new form of encephalitis lethargica", displaying all the peculiar classical symptoms of acrodynia—conjunctivitis, facial and peripheral œdema, and a curious erythematous rash *en placards*. Two recent accounts of grouped cases resembling and identified with acrodynia have been reported from the United States. The lately described Haitian epidemic dropsy seems also to call for examination from this point of view.

Reference.—[1]*Med. Press*, 1920, Dec. 22, 495.

ADRENAL GLANDS. (*See* Endocrinology.)

ALASTRIM. (*See* Small-pox.)

ALCOHOL AND MENTAL DISEASE. (*See* Mental Disease.)

ALOPECIA AREATA. (*See also* Skin Diseases, General Therapeutics.)

E. Graham Little, M.D., F.R.C.P.

Barber[1] thinks that alopecia areata is due usually, if not invariably, to focal infection, the foci being the teeth, gums, tonsils, nasopharynx, or nasal sinuses, in the great majority of cases. The *Streptococcus pyogenes longus* is the usual infecting organism. The loss of hair is probably an anaphylactic phenomenon, the antigen being bacterial protein, probably usually of the organism named, absorbed from the teeth, tonsils, nasopharynx, etc. In the author's series of cases 62 per cent were associated with infected tonsils or adenoids, a proportion perhaps unusually large, and due to the preponderance of children; with oral sepsis alone, 5 per cent; with oral and tonsillar sepsis together, 25 per cent; with chronic otitis media and nasopharyngitis, 2 per cent; with chronic nasopharyngeal catarrh, without obvious tonsillar sepsis, 4 per cent; and with severe ethmoidal suppuration and polypi, 2 per cent. The prevalence of alopecia areata after influenzal attacks is explained by the part played by streptococcic infections of the hæmolytic type, which predominate in influenza. It is important to note that the tonsil may be small and almost invisible and yet deeply infected. The help of an experienced laryngologist should always be sought in cases of doubt.

The treatment is obviously to remove as completely as possible the focus of sepsis. **Vaccine** therapy, with autogenous vaccines, is highly valuable, and the most useful second string in cases where removal of foci is impracticable. If anæmia is present, as is commonly the case, internal treatment by the administration of **Iron** and **Arsenic** is recommended, and where there is hyperchlorhydria, the exhibition of dilute **Hydrochloric Acid. Urotropine** is said to be of value, and in adults suffering from nervous exhaustion, **Bromides, Generous Diet,** and **Rest** and **Change** are advocated. For local treatment the author recommends painting on the site pure **Carbolic Acid** [I cannot endorse this advice.—E. G. L.] or pure **Lysol,** which may be repeated when the inflammation has subsided. Or the following lotion may be used, especially where there is concomitant seborrhœa or pityriasis of the scalp :—

℞	Hyd. Perchlor.	gr. iss	Ol. Amygd.	♏ij–v
	Acid. Salicyl.		Aceton.	ʒij
	Chloral Hyd.	āā gr. x	Sp. Vini Rect.	ad ℥j
	Ol. Lavand.	♏ij		

Leslie Roberts[2] supports a similar thesis of causation of alopecia areata, and produces a number of cases in which examination of tonsils after tonsillectomy showed infection with *Streptococcus longus.*

References.—[1]*Guy's Hosp. Rep.* 1921, Jan., 121; [2]*Brit. Jour. Dermatol.* 1921, Oct.

AMŒBIASIS.

Sir Leonard Rogers, M.D., F.R.C.P., F.R.S.

Etiology.—Yoshida[1, 2] has recorded two years' study of encystation and reproduction of *E. histolytica* and *coli* in vitro in cultures in 1 part of horse serum and 4 parts of Ringer's fluid plus red corpuscles at a temperature from 22° to 27° C., the organisms living on an average 36 to 72 hours. He describes the karyosome as swelling up and the vegetative forms becoming smaller and active, four nucleated cysts appearing. About the third day reproduction takes place from the cysts by a new process of fertilization, and the young amœba escapes through a break in the wall of the cyst, feeds on bacteria, and reaches the normal size on the fourth day. Confirmation will be awaited with interest. G. C. Chatterjee[3] describes what he believes to be a new pathogenic human entamœba found in a single case of dysentery, the material from which unfortunately was not fresh when examined. In stained preparations and sections of the tissues the nucleus of the organisms showed a uniformly stained mass of the 'limax' type, while the ectoplasm was clearly defined from the endoplasm. L. Cook[4] is not convinced that dysentery bacilli and the *E. histolytica* are the causes of dysenteries, and thinks predisposing causes, such as unhealthy mucous membrane, are not allowed sufficient weight in the causation of these diseases.

COMPLICATIONS.—E. P. Hogan[5] describes the microscopical and clinical characters of a case of amœbic ulceration of the appendix, which proved fatal after operation. B. Hughes and H. S. Banks[6] describe cases of gangrene of the colon of amœbic origin, in some of which operation proved futile and only hastened the inevitably fatal ending.

DISTRIBUTION.—C. Dobell[7] records important results from the examination of the stools of the working class in the north of England; most of them had never left this country, yet from 7 to 10 per cent were found to be infected with *E. histolytica* cysts, and 35 to 54 per cent with those of *E. coli*, without any symptoms of dysentery having occurred. The two sexes were equally infected, but miners more so than other classes, while instances of family infections were met with. In this and in other countries only a small number of the infected actually suffer from amœbic dysentery, but indigenous cases may arise. In North Queensland P. A. Maplestone[8] reports that a single examination for cysts in 500 people showed 4·6 per cent with *E. histolytica* and 26·8 per cent with *E. coli*, children and young adults being most infected, but there were no differences between the sexes. R. W. Mendelson[9] deals with amœbic dysentery in Siam, where he diagnosed 135 cases among 13,000 hospital patients, and found no other treatment effective in those who relapsed after emetine.

DIAGNOSIS.—P. Manson-Bahr and A. L. Gregg[10] record the routine use of the sigmoidoscope in the diagnosis of dysentery, and illustrate some of the conditions met with, and they point out that a rapid diagnosis can often be made and material can be taken from any ulcers present for microscopical and bacteriological examinations with much better prospects of success than by examinations of stools, while pathological conditions other than dysentery can be detected and dealt with. In amœbic cases oval or diamond-shaped small ulcers with congested margins and bases covered with grey or greenish sloughs are most frequently met with. In 100 consecutive cases, positive or suggestive diagnoses of amœbic dysentery were made in 42 per cent, and of bacillary dysentery in 28 per cent, against 31 and 5 per cent respectively by microscopical examinations.

TREATMENT.—Margaret W. Jepps[11] reports on the treatment of 103 *E. histolytica* infections in a war hospital, controlled by microscopical examinations for a month subsequently. Salol-coated pills of **Emetine Bismuth Iodide** gave the poor result of 45 per cent of relapses; but with an emulsion of 3 gr. to half an ounce of liquid paraffin, taken in two or three ounces of water, in which it floats, a course of 36 gr. in twelve days cleared all but 12·7 per cent of 63 cases, while 5 of the 6 who relapsed were acute or subacute cases of amœbic dysentery, and of 57 carriers showing no signs or but slight symptoms, only 3·5 per cent were not cured. A double course was given with success in one of the failures; while when the drug could not be tolerated, twelve daily injections of 1 gr. of emetine proved effectual in 3 of 5 cases.

AMŒBIC HEPATITIS AND LIVER ABSCESS.

DIAGNOSIS.—A. Hall[12] discusses with diagrams the diagnostic value of deep liver dullness up to the 4th rib, displacement of the maximum cardiac pulsation outwards and upwards into the 4th space, and impairment of the resonance at the right apex, as early signs of amœbic hepatitis indicating immediate **Emetine** treatment, and records cases in which these signs enabled suppuration to be averted. They are of especial value in chronic cases with indefinite hepatic symptoms, when the beneficial effects of a few days' emetine treatment will confirm the diagnosis. A history of dysentery or diarrhœa was obtained in 27 out of 33 cases. T. S. Mebane[13] advises more extended liver puncture in the diagnosis of liver abscess, and has not seen bad results follow it, in which respect he has been more fortunate than many surgeons, while experienced tropical physicians now prefer to give emetine first in doubtful cases of amœbic hepatitis in which suppuration is only suspected.

Treatment.—1. Ludlow[14] records a second series of liver abscesses treated by the **Open Operation** in China, bringing up his total to 60 with the low mortality of 11·6 per cent ; but he is now trying the **Aspiration** and **Emetine** method. T. S. Mebane[13] also used the open method, preferably by the transthoracic route, and had a mortality of over one-third. V. S. Hodson[15] records three cases seen in Kartoum and diagnosed as liver abscess which appear to have been cured without operation by emetine injections. B. Hughes and H. S. Banks[16] always opened their liver abscess cases through the abdomen and irrigated with **Quinine** solution, and lost 44·4 per cent of 9 cases, the fatal ones being multiple abscesses. [A table is given in the new edition of my book on *Bowel Diseases in the Tropics* showing a mortality of 56·8 per cent in 2661 liver-abscess cases treated by the open operation, and 14·4 per cent in 111 cases, or one-fourth, with my method of repeated aspiration and emetine injection, which should hasten the more general adoption of the latter method. —L. R.]

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AMPUTATIONS.

Sir W. I. de C. Wheeler, F.R.C.S.I.

Corner,[1] in a very practical paper, deals with the question of amputations in the light of recent knowledge. The great experience of the limb-makers as a result of the war has been of much assistance to the surgeon in deciding the best level for amputation from the utility point of view. He dismisses the operations of Lisfranc, Chopart, Pirogoff, Roux, Skey, Hey, etc. ; Syme's operation, performed at a higher level than usually taught, gives a very good stump, but he thinks the operation has many disadvantages, and can be wholly replaced by the earlier and more satisfactory one through the middle of the leg. Patients with the latter avoid unsightliness and expensive upkeep. The operation should be done with anterior and posterior skin-flaps, the former being the larger, making the scar posterior. The operation of Farabœuf and Teale should be dispensed with. Stephen Smith's operation through the knee-joint should be no longer performed. The retention of the patella, as in the operations of Lister, Gritti, and Stokes-Gritti, is a handicap to the limb-maker. Operations of the thigh should be performed with anterior and posterior flaps, and a posterior scar like a Carden, but higher up. In amputation of the hip, the Furneaux-Jordan operation or its modifications has been found to yield a large, bulky, useless stump. The operation should be performed by skin-flaps, and the muscles should be cut short. The neck of the femur should be divided and the head left behind, filling up the acetabulum. It is really an amputation through the neck of the femur by means of an anterior racquet incision.

The soft parts are cut so short that they cannot push the artificial limb off the tuber ischii. It is no use operating less than three inches above or below the level of the knee-joint. It is far better to operate through the neck of the femur than at any point below the lesser trochanter.

All forearm amputations are now done with equal anterior and posterior skin-flaps and circular division of muscle and bone. It is of no use amputating less than three inches above or below the elbow. Amputations of the upper arm are done with a circular incision. High up, this is converted into a racquet by an internal incision. Nothing useful can be fitted on to a short forearm stump.

Amputations Remaining in Use.—In the lower limb there remain: (1) Amputations of toes; (2) A Syme's amputation; (3) Through leg amputations with skin-flaps: (4) Amputations of thigh with long anterior and short posterior flap; and (5) A new amputation through the neck of the femur with skin-flaps. In the upper limb there remain: (1) Amputations of fingers; (2) Amputations of forearm with equal skin-flaps; (3) A circular amputation of upper arm; and (4) Spence's amputation at shoulder.

Bailey[2] says that for exarticulation of the hip the mortality is still too high. He thinks that preliminary ligation of the common iliac artery increases the element of safety.

'*Spontaneous*' *Ulcer Formation on Amputation Stumps.*—Leriche[3] describes a type of ulcer occurring on the stump which is appreciably not due to disease of the underlying bone, nor yet to pressure from ill-fitting apparatus. These stumps, though well covered, are not of normal behaviour. They are habitually cold, with occasional attacks of local œdema, usually of several days' duration, with pain referred to the amputated portion of the limb. Then a phlycten slowly forms and gives way, leaving behind it a shallow indolent ulcer which firmly resists all local applications. These ulcers show little or no tendency to repair. In such a case, an ulcer of fifty-four days' duration, Leriche carried out a perifemoral **Sympathectomy** in Hunter's canal. The arterial sheath was materially vascularized and thickened: some 6 to 8 cm. were stripped off the sheath, the wound closed, and a dry dressing applied to the ulcer. The most marked immediate effect of the operation was the complete cessation of pain in the stump; a slow but progressive process of repair set in on the ulcer site, which was covered with epithelium on the thirty-sixth day from operation. Four months later the patient reported uninterrupted progress. The vasomotor troubles in the limb, the operative findings, and the therapeutic effect of operation all point to an abnormality within the peri-arterial sympathetic system as being responsible for this troublesome type of ulceration.

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ANÆMIA.

Herbert French, M.D., F.R.C.P.

TREATMENT.—Sonne[1] gives the detailed history of a case of severe anæmia in a woman of 38 who was under his observation for five years. Arsenic never influenced the hæmoglobin percentage, nor did the organic preparations of iron, in marked contrast to the benefit resulting from the administration of inorganic **Ferrous Sulphate** and **Reduced Iron**, which latter he considers the most efficient preparation, and advocates its use in larger doses than those usually given.

REFERENCE.—[1]*Hospitalstidende*, 1920, Nov. 17.

ANÆMIA, PERNICIOUS. (*See* PERNICIOUS ANÆMIA.)

ANÆSTHETICS.

J. Blomfield, M.D.

Methods of Reviving Patients apparently Dead from Shock, from Anæsthetic Effects, or Both.—Two methods have received much attention recently—namely, (1) **Cardiac Massage,** and (2) **Direct Injections into the Heart.** With regard to the latter, it may be stated that if they prove to be efficient, they have the advantage of greater simplicity and rapidity. It is a more rapid and easy process to push a needle into the chest and reach the heart than to open the abdomen for the performance of massage. When the abdomen is already open the position is of course different, and here direct massage should be the first measure tried if effective artificial respiration has failed.

J. A. Gunn[1] draws attention to details in the performance of cardiac massage the importance of which are established experimentally. Compression should be gradual and relaxation abrupt. The rate of compression should be at most less than half the normal heart-rate. Massage should be regularly interrupted at short intervals for a few seconds to allow the spontaneous beats to develop. Massage properly performed acts both as an artificial circulation and as a mechanical stimulus to the heart muscle. If when the heart has been started the blood-pressure continues low and the beats remain feeble, speedy and permanent improvement of the heart and blood-pressure can be obtained by intravenous injection of either **Adrenalin** or **Pituitrin.** Gunn points out that the difficulty is not so much in starting the heart as in starting it soon enough for tissues not to be already rendered incapable of recovery by the stoppage of the circulation. It is the cells of the central nervous system that are most susceptible to this stoppage, so that from the practical point of view the heart must be restarted before these are irretrievably damaged. Current opinion holds that after complete stoppage of the circulation for about fifteen minutes the cortical cells cannot be revived. It appears that very little circulation makes all the difference to the cells of the central nervous system, and that since massage does actually cause a certain amount of artificial circulation, the chances of recovery can be reckoned from the beginning of the performance of massage, not merely from the time when the heart starts to beat again. The advantage of applying massage intermittently, not continuously, is that its effect as a mechanical stimulus is then allowed to come into play. The feeblest beat developed as a result of the stimulus of massage will develop best if uninterfered with immediately by further massage. A slow rate of compression is necessary, both to allow complete filling of the ventricle and because it is a subnormal rate that one is attempting to elicit—viz., the rate at which the arrested heart will begin beating again. This writer states that there is no known drug comparable with adrenalin in efficacy to start an arrested heart or to antagonize the action of chloroform. It has a power, equivalent to stimulation of the sympathetic nerve to the heart, of antagonizing muscular paralysis; and Gunn has shown that when the isolated mammalian heart is perfused with a concentration of chloroform which almost or even completely arrests the heart, the addition of adrenalin to the solution is able to restore the heart beats to their normal vigour. In practice, of course the difficulty is to get the adrenalin into the heart when circulation has ceased. Since massage of the heart causes a circulation, adrenalin injected into a vein will reach the heart in time, and this will occur the sooner the nearer the vein is to the heart. It is well known that adrenalin and chloroform together are likely to produce fibrillation. According to Gunn, however, this is only true of cardiac arrest from chloroform in the initial stages of anæsthesia. Moreover, this authority maintains that the transient nature of the rise in blood-pressure, which is all that adrenalin can produce in the normal animal, is not present when the animal is being resuscitated after arrest of the heart. In this condition the rise of blood-pressure produced by adrenalin may be permanent. Gunn recommends that when the heart has begun to beat regularly and strongly, an intravenous injection of **Atropine** should be given. This is because he attributes to possible excessive vagal action the secondary stoppage which sometimes occurs and is fatal after the heart has apparently been restored to activity. Natural respiration may be expected to begin in five to ten minutes after the heart has resumed beating. Artificial respiration is kept up after the heart starts beating again, and is interrupted occasionally to see if spontaneous respiration has yet set in.

The value of **Adrenalin** in cases of apparent death, whether from anæsthesia, asphyxia, electric current, or violent emotion, is further demonstrated by Cranston Walker,[2] who has tried injection of this drug into the heart after death from various causes. When death had occurred as the result of long-established disease, no effect was observed. Nor was any effect produced in a young man who, twenty minutes previously, had received a fatally powerful electric shock. In a child of eleven months whose heart ceased to beat during a circumcision under chloroform, the injection of adrenalin restarted the heart although artificial respiration and massage (through the unopened abdomen) had been without avail. It is stated that the heart could be felt and grasped by the fingers pressed up under the costal margin. It was estimated that the heart had stopped for at least four minutes before adrenalin was injected. The child recovered. Vogeler[3] records a case in which intracardiac injection of 1 c.c. of **Epinephrin** restarted a heart from which no sounds could be heard with a stethoscope before the injection.

Guthmann[1] recommends the intracardiac injection of **Adrenalin** and **Strophanthin,** and maintains that the latter drug prolongs the effect first produced by the adrenalin. He employs 1 mgrm. of each drug. Five cases are recorded, in 1 of which the heart failure was associated with chloroform, in 3 with peritonitis, and in 1 with internal hæmorrhage from an extra-uterine pregnancy. The last case was resuscitated and lived. The peritonitis patients were revived to the extent of becoming conscious, but failed again and died ; the resuscitation was attempted at the end of a fatal illness. The chloroform case recovered. The syncope occurred here after a small dose of chloroform in a patient who had received a spinal injection and had undergone removal of a large ovarian cyst. Vogt[4] regards strophanthin as a great disadvantage, and quotes Fränkel and van den Velden in support against the use of this drug for intracardiac injection.

Administration of **Carbon Dioxide** *after Anæsthesia.*—This has been advocated especially by Yandell Henderson and Haggard.[5] It is claimed that recovery from the anæsthesia is hastened by the augmentation of breathing, that a stimulating effect is produced on the circulation, particularly the venous return, and that rapid restoration of the arterial pressure is brought about and maintained. Further, the treatment is held to diminish or abolish gas pains after operation. A recent article[6] condemns the inhalation of carbon dioxide, and maintains that the objects aimed at by its administration are much better achieved by the administration of **Sodium Bicarbonate.** If before operation the plasma of a patient shows a carbon dioxide carrying capacity of 58 c.c. or less per 100 c.c. of blood, sodium bicarbonate is to be given. The dose is calculated according to the desired increase in plasma carbon dioxide and the patient's weight. The maximum height of blood carbon dioxide is reached in about two hours after giving sodium bicarbonate by the mouth.

A new Ether.—Mackenzie Wallis and Langton Hewer described the chemical and clinical properties of '**Ethanesal**' at the Anæsthetics Section of the Royal Society of Medicine.[7] The use of pure ether as a vehicle, the removal of mercaptans, and the retention of certain ketones, are the important chemical features in the manufacture of the new agent which is sold under the above name. Hewer's remarks were based on detailed reports of 200 cases. In 91·3 per cent the anæsthesia was very good, with no salivation, straining, or other difficulty. In 8 per cent there was slight difficulty—e.g., straining or salivation. In only one case was there great difficulty or poor anæsthesia. The anæsthetic was used just as is ether, by an open method or in a 'Clover', or in combination with gas and oxygen. Given to 10 patients with well-marked bronchitis, there was no aggravation of the symptoms. Hewer states that the respiration is quieter than with ordinary ether, that the irritation of the air-passages is less, that the pulse-pressure curve is higher at the end of operation than that of either chloroform or ether, and that with the exception of one patient no subject had prolonged vomiting extending over one day. Further experience in the hands of many anæsthetists suggests that ethanesal has to be used in rather larger quantities than ordinary ether to produce an equal anæsthetic effect, and that its chief advantage lies in comparative freedom from unpleasant taste afterwards and in lessened vomiting.

Prolonging Nitrous Oxide and Oxygen Anæsthesia in Dental Operations.—Ecker[8] passes the gases over a mixture of 50 per cent each of **Anæsthol** and **Paraldehyde.** Anæsthol is itself a mixture of ethyl chloride (17 per cent), chloroform (35 per cent), and ether (47 per cent). Ten drops of anæsthol was the average amount used for each patient in 12,000 administrations. No detail of method is given, but without doubt the apparatus usually employed for continuous gas-oxygen, which allows of the interposition of ether, would be perfectly suitable. About one and a quarter minutes for induction, with available anæsthesia of two minutes, is the usual effect. A mixture with the same components as those of anæsthol, but in different proportions, is recommended by Le Clerc-Dandry, of Belgium.[9] His mixture is composed of equal volumes of ether and chloroform with half a volume of ethyl chloride. Before its use he injects hypodermically **Dionin** and **Heroin** (0·005 gr. each), **Morphine** 0·01 gr., and **Hyoscine** 0·0001 gr., one and a quarter hours before operation. The method is recommended only for adults.

Accidental Explosion of Ether Vapour.—Instances showing the possibility of this occurrence were related at the Section of Anæsthetics.[10] W. J. McCardie related a remarkable case in which the explosion coincided with the introduction of an electric laryngoscope into the mouth of a man under ether. Reports like small pistol-shots were heard, and flames several inches high issued from the patient's mouth. These quickly died, and there were no after-effects except some reddening of the mouth and pharynx, and the patient recovered normally. Ether has been known to take fire at a distance of 15 feet from the source of flame, and particularly when open methods are in use. Great care is necessary in the presence of a fire or unguarded light. At the same meeting R. E. Apperly related cases showing the value of examination of patients by the anæsthetist previous to his administration.

Post-operative Morbidity in Relation to Anæsthesia.—H. T. Thomson[11] recommends the pre-operative administration of **Bicarbonate of Soda.** He refers to the finding of Caldwell and Cleveland that the blood of patients receiving no sodium bicarbonate before operation showed lower carbon dioxide tension in the specimen taken just before anæsthesia than in that taken the day before. This is due in measure to preliminary purgation and starvation. Sodium bicarbonate reduces the danger of operation in shocked patients and may act as a preventive to the development of shock. It appears that low blood-pressure and acidosis, whether causally related to shock or not, are at any rate both present in this state. Administration of alkali is a guard against the onset of acidosis, and probably to some extent therefore a guard against shock. "The acidosis which prevails in cases of low blood-pressure is associated with such sensitization of the body that surgical operation may result in a serious increase of the acidosis or perilous sinking of the blood-pressure." Advantage will be gained by protection against each of these conditions, and this protection is claimed for the administration of sodium bicarbonate. Discussing the significance of acidosis in shock, the author quotes John Fraser: "Acidosis in the sense of a simple reduction of the bicarbonate of the blood plasma is not the cause of shock or an important factor in its production. A progressive uncomplicated fall in the alkali reserve of the blood is the result of inadequate oxygen supply to the tissues. Oxidation of the tissues is more readily rendered inadequate by defective circulation through the capillaries than by a reduction of the oxygen-carrying power of the blood or of oxygen tension in the inspired air when the circulation is kept at an efficient level. The essential underlying factor in the pathology of surgical shock is a prolonged and progressive fall in blood-pressure. The causes which may inaugurate the fall are various." Nervous causes, hæmorrhages, colds, and toxic products are some of the means of originating the fall of blood-pressure. This leads to capillary stasis—suboxygenation of tissues—which in turn leads to lowered blood-pressure; so that a vicious circle is formed which will lead to a fatal issue if some link in the chain is not broken and the error of the blood-pressure overcome.

The Effect of Ether on the Alkali Reserve of the Blood.—W. S. Carter[12] in an experimental study found that there is an actual decrease, but little diminution during the first hour of anæsthesia. The greatest decrease occurs at the end of anæsthesia, and is in direct proportion to its duration. The effect lasts from one half to one hour, and following this there is a rapid increase in the alkali reserve, which returns to normal in from one to two hours after anæsthesia.

Intratracheal Anæsthesia by the Nasal Route.—For operations on the mouth and lips this presents certain advantages. S. Rowbotham[13] describes his technique, which consists in passing a catheter through the nose and nasopharynx, catching it up by means of a special guiding rod, and directing it into the trachea. These manœuvres may be supplemented by the provision of a return nasal airway, which prevents bubbling of the blood in the mouth and directs expired vapours away from the surgeon.

Synergistic Colonic Analgesia.—Under this title Gwathmey[14] describes the use of **Magnesium Sulphate** in conjunction with colonic injection of **Ether.** The basis of the process is Meltzer's observation that "when after the administration of a very small amount of ether, insufficient to cause anæsthesia, an insignificant amount of magnesium sulphate is injected intramuscularly, a profound anæsthesia follows, which can be maintained for several hours". It has been found that the addition of a small amount of magnesium sulphate to the usual hypodermic of morphine increases the value of the injection from 50 to 100 per cent. Gwathmey proposed to employ this combination to secure a complete brain block, and ally this with the use of a small amount of ether. He hoped thus to obtain a condition of analgesia and unconsciousness without entering the third stage of anæsthesia at all. Animal experiments proved that ⅛ gr. of morphia in 2 c.c. of a 25 per cent solution of chemically pure and sterilized magnesium sulphate, given hypodermically twice at half-hour intervals, produced analgesia. The same dose of morphia without the sulphate produced nothing like the same degree of insensibility. With human beings it was found that general analgesia could not be obtained by morphine or magnesium sulphate alone. Three hypodermic injections, however (morphia gr. $\frac{1}{8}$, mag. sulph. 2 c.c. of 25 per cent solution), supplemented by nitrous oxide and oxygen with much higher percentage of oxygen than usual, were followed by analgesia with unconsciousness and complete relaxation. This hypodermic given two hours before operation, and repeated twice at half-hourly intervals, reduced the amount of ether needed for colonic anæsthesia by about one-half.

Oil-ether Rectal Anæsthesia.—Chalier and Dunet[15] analyzed a total of 2855 cases. These figures include 1500 from Russia and 1000 from America. The authors found six fatalities for which the method itself seemed responsible, and regard it as too dangerous "except for young persons free from pathologic taint with their emunctories functioning well".

Spinal Analgesia.—F. Ranucci[16] found that a transient albuminuria is not uncommon after intrathecal injections of stovaine or of novocain. He attributes this, not to any action on the renal epithelium, but to an effect on the central nervous system, and he believes that for patients with a renal or hepatic affection spinal analgesia is safer than any general anæsthetic. H. M. Page,[27] writing on spinal analgesia for suprapubic prostatectomy, says he has reduced the dose of stovaine to a maximum of 0·03 grm. (i.e., $\frac{3}{10}$ c.c. of a 10 per cent solution). This he uses without glucose, and always has the patient's head low. This position is retained while the patient is returned to bed, and afterwards until the effects of the injection have passed. Page produces unconsciousness in all cases, using oxygen with whatever general anæsthetic is selected. Two of the patients were over ninety years of age. There has been no case of immediate death, and the operative mortality has been under 5 per cent. Guibal[17] reports three cases of prolonged apnœa during spinal analgesia, requiring artificial respiration for fifteen minutes, for seventy minutes, and for two and a half hours. He is of opinion the apnœa is due to the effect of stovaine on the respiratory centre and is met only when a high anæsthesia is present. Bungart[18] also treats of the undesirable symptoms met with during spinal analgesia, and believes that they are mostly to be accounted for by defective preparations, and instruments which have been in use during the years of the war and after. Similarly Delmas[19] maintains that the disfavour into which spinal analgesia with cocaine has fallen is due to faulty technique and impure cocaine. The drug should not be dissolved, he says, until the moment that it is to be used. He relates 30 cases of gynæcological and obstetric operations with cocaine spinal analgesia. Bloch[20] asserts that the heights to which analgesia extends after spinal injection depends on the amount of cerebrospinal fluid allowed to escape. According to its tension, 20 to 25 c.c. are allowed to escape for an analgesia reaching to the breast, 25 to 30 for one reaching the head. The dose of anæsthetic injected determines the duration of the analgesia. Novocain is the anæsthetic that he prefers, and he regards 12 cgrm. as the maximum dose. To this he generally adds $\frac{1}{4}$ mgrm. adrenalin.

Splanchnic Analgesia.[21]—Methods of local anæsthesia for laparotomy are not as successful as with more superficial operations. The abdominal wall can be quite satisfactorily anæsthetized, but difficulty arises with the peritoneum or with the viscera themselves. Paravertebral conduction anæsthesia is tedious and trying both to the anæsthetist and to the patient. Attempts have also been made to obtain anæsthesia for various gastric operations by injecting 50 to 80 c.c. of a 1 per cent novocain solution through the anterior abdominal wall into the solar plexus or its vicinity. Others have obtained this result by injecting novocain-adrenalin into the solar plexus after opening the abdomen. Labat attempted to improve the technique (1) in order to complete the anæsthesia before the operation is begun, (2) because the results obtained were not constant. He follows Naegeli and Kappis in injecting from behind.

The patient lies on his side with the back arched. The 12th rib and 1st lumbar spine are defined. On the lower border of the 12th rib, 7 cm. from the mid-line of the back, an anæsthetic wheal is raised, and through this a needle 12 cm. long is passed vertically to the table. The needle is pushed in obliquely forwards to make an angle of about 45° with the median plane. Its point should strike the body of the vertebra near its anterior convexity, behind the splanchnic nerves, where these join the semilunar ganglion. When the needle, introduced for about 9 cm., has struck the bone, it is drawn back until its point lies in the subcutaneous tissue, and re-introduced at a smaller angle. It should pass tangentially to the body of the vertebra. As soon as it is felt to glide along the surface of the vertebra, it is pushed in 1 centimetre further. After making sure that no blood comes out of the needle, there are injected at this level 25 to 35 c.c. of a 1 per cent novocain-adrenalin solution (novocain 1 grm.; adrenalin 25 drops of a 1–1000 solution; and normal salt solution 100 c.c.). The patient then changes sides and the process is repeated. The solution spreads easily into the loose retroperitoneal tissue, reaching the solar plexus and its immediate tributaries as well, thus anæsthetizing a wide area in which all operative manœuvres are painless. Beyond its field of action novocain produces a ring of hyperæsthesia, and distant pulls on this ring give rise to painful impulses. Labat has employed the method 34 times for abdominal operations, especially gastric ones. He reports 30 good, 2 fair, and 2 bad results.

Preiss[22] injects on a level with the 3rd lumbar vertebra, and says that a secondary injection may be made from the front after the abdomen is opened. He prefers 2 per cent procain-epinephrin solution. Injection into a vessel may be serious. Acute intoxication followed injection into a vein; cramps, collapse, arrest of breathing, were the symptoms, but recovery followed. Billet and Laborde[23] give a detailed account of the anatomy of the splanchnic nerves and of the route which the injecting needle takes. They point out that the needle does not leave muscle until it enters the paravertebral cellular tissue into which the injection is made, and they say that it is easy to feel when the point of the needle emerges from the muscle. These authorities, instead of turning the patient from one side to the other, inject twice the quantity (50 c.c.) into one side only.

Nolle[21] relates an instance of greatly increased reflex excitability lasting for two days after splanchnic injection of 100 c.c. of 0·5 per cent solution of procain and epinephrin. At a slight touch spasmodic jerks of the whole abdominal musculature occurred. Adjusting the bedclothes or turning on the electric light elicited a jerk. The abdomen was distended and the face anxious and perspiring. The syndrome resembled tetanus, but the muscles of the jaws and neck were unaffected.

Local Analgesia.—Hirschfelder[25] says that **Saligenin** (salicyl alcohol) stands pre-eminent for this purpose. It has the lowest toxicity, the least tendency to cause wheals or subcutaneous œdema, and the highest selective action in blocking sensory nerves. Reding[26] describes a new method of regional anæsthesia for the upper limit. His injection is designed to catch the nerves as they emerge from the brachial plexus and are still near together. The article is illustrated, and shows the point in the upper arm where the needle is to be entered.

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ANAPHYLAXIS.

Herbert French, M.D., F.R.C.P.

In a communication to the Académie des Sciences, Richet, Brodin, and Saint-Girons[1] give a description of anaphylactic shock and a means of preventing it. "If, three weeks after a preliminary (sensitizing) dose of horse serum into a dog we give a second injection of 50 c.c. of the same serum, the anaphylaxis, which never fails, is sudden and intense. Diarrhœa, almost hæmorrhagic intestinal congestion, rectal tenesmus, vomiting, dilatation of the pupils, lowering of the arterial pressure, absolute motor paralysis, asphyxiation, enfeebled pulse, and heart failure result. Death occurs usually in two or three hours, sometimes in a few minutes. If, instead of injecting the plasma alone, we inject the same quantity diluted with nine times its volume of **Isotonic Salt Solution,** no reaction occurs other than a slight diarrhœa with faint paresis, which pass off in a quarter of an hour." It is not a question of dilution only, for it is found that if an isotonic glucose solution, or a 0·4 per cent salt solution, is used, or only five instead of nine volumes of isotonic salt solution, anaphylaxis occurs with practically the same violence as if the undiluted serum had been used.

Other workers have used other salts with successful results. Thus Sicard and Paraf[2] find that 1 grm. of **Sodium Bicarbonate** in 30 to 40 c.c. water, given intravenously fifteen minutes before injecting the serum, prevents the occurrence of anaphylaxis ; while Lumière[3] gave the serum mixed with an equal volume of a 5 per cent solution of **Hyposulphite of Soda.** Experimenting with guinea-pigs, he found that this preserved sensitized animals from death, which occurred in all the control animals that were given the second dose of serum without the admixture of sodium hyposulphite.

Spolverini,[4] reasoning from the results of peptone treatment in conditions analogous to anaphylaxis, experimented successfully in the case of 26 children between two and six years of age who had been rendered sensitive by the previous administration of antidiphtheritic serum. He found that 10 or 15 cgrm. per kilo. of dry **Peptone** in a 5 per cent isotonic solution was successful in averting anaphylaxis when given subcutaneously a day or two before the second dose of serum.

Therefore it seems that there are available several simple means of preventing the occurrence of this very alarming phenomenon, but so far there has been no more satisfactory explanation of its causation than of its prevention. The continental workers all attribute it to the formation of a very insoluble precipitate in the blood-serum of the patient which profoundly interferes with the capillary circulation and produces an asphyxia in the tissues themselves.

References.—[1]*Comptes rend. de l'Acad. des Sciences,* 1919, July 7 ; [2]*Bull. Soc. méd. Hôp. de Paris,* 1921, Jan. 28 ; [3]*Med. Record.* 1921, April, 16, 660 ; [4]*Pediatria,* Naples, 1920, Sept., no. 18

ANEURYSM. (*See also* Vascular Surgery.)

Carey F. Coombs, M.D., F.R.C.P.

Aortic Aneurysm.—Martinet's[1] summary of 29 cases shows that it is a lesion of the fifth and sixth decades, that four-fifths of the patients were men, that syphilis is an almost constant causal factor, and that patients may live for years at a pitch of fair activity in spite of carrying about a considerable aneurysmal sac. Only about half the patients die suddenly.

Conti[2] records a case of rupture of aortic aneurysm into the pulmonary artery, and observes that this calamity can be diagnosed only when to the pre-existent picture of aortic aneurysm is added that of a sudden cardiac catastrophe followed by the development of permanent physical signs, usually a loud bruit at the pulmonic cartilage.

Aneurysm of the Hepatic Artery.—Cases of this rare lesion are recorded by Högler[3] and Weiss.[4] The symptoms are pain, jaundice, and gastro-intestinal hæmorrhage, often recurrent. Even at exploratory operations the presence of an aneurysm is often missed, and although Högler's patient developed a bruit in the right hypochondrium there is seldom any physical sign to help the observer to a correct diagnosis. In several cases, however, it has been possible to treat the lesion by ligation of the hepatic artery—twice with success.

Aneurysm of the Splenic Artery.—This is an even rarer lesion, and Högler[5] thinks his case is the only one in which a correct diagnosis was made during life; the symptoms being severe spinal pain with development of a pulsating swelling in the left hypochondrium, over which a systolic bruit was heard. The patient died of intercurrent pancreatic cancer.

REFERENCES.—[1]*Presse méd.* 1920, 733; [2]*L'Ospedale Maggiore*, 1921, 113; [3]*Wien. Arch. f. inn. Med.* 1920, Aug., 509; [4]*Amer. Jour. Med. Sci.* 1921, i, 859; [5]*Wien. Arch. f. inn. Med.* 1920, Aug., 543.

ANGINA PECTORIS.

Carey F. Coombs, M.D., F.R.C.P.

CAUSATION.—Verdon's[1] interesting and original monograph was written in support of a belief in "hyper-irritability of the central nervous system as the predisposing cause of seizures and as the basis of the anginous habit". The seat of the proximal exciting cause, in his view, lies in the muscular tunic of the gastro-œsophageal portion of the alimentary canal, and he regards disturbance of the heart, when it occurs, as a concurrent symptom of no causal significance. This iconoclastic creed is derived by much ingenious argument from close and prolonged study of a small number of cases and a thorough, though possibly somewhat prejudiced, examination of the literature of the subject. It is probable that this view—that spasm of the cardia of the œsophagus is the cause of angina pectoris or of pain indistinguishable from it—is applicable to some cases, and so far it is supported by so sober and critical an observer as Sir Thomas Horder.[2] But it is impossible to set aside the immense mass of evidence, to which electrocardiography is adding (Willius[3]), in support of the theory which ascribes anginal pain to myocardial disease or disorder. An extremely interesting case is recorded by Bard,[4] of a man of 33 who had anginal attacks, local asphyxia of Raynaud type affecting one finger and accompanying the anginal seizure, and blindness of one eye caused by obstruction, thrombotic or embolic, of the central artery of the retina. In one of the attacks he died suddenly, but no autopsy was made. Bard thinks an angioneurotic spasm of the coronary arteries killed the man by stopping the nutrition of the heart muscle. But the retinal lesion, itself due to some permanent arterial closure, provokes the thought of a similar blockage of the coronary vessels, as being at least as probable as a merely angiospastic closure. A case quoted by Lutembacher[5]—to show how serious a sign is a sudden fall of blood-pressure accompanying an attack of angina pectoris—goes to support the view expressed in recent volumes of the MEDICAL ANNUAL, that coronary thrombosis is at the bottom of the severest attacks of angina, those which are followed by acute dilatation of the heart, enfeeblement of the heart sounds, irregular tachycardia, and so on. In one such case Lutembacher found an adherent clot obstructing the orifice of the left coronary artery.

Treatment.—Jonnesco[6] describes the course of a case of angina which he treated **Surgically**, in a man of 38, with syphilitic aortitis, by resection of the left cervical sympathetic nerve with the last two cervical and the first of the dorsal ganglia. The argument in defence of this proceeding was that angina pectoris is due reflexly to irritation of the cardio-aortic nerve plexuses by disease of the aorta and mediastinum: and that ablation of the afferent paths by which these morbid stimuli are carried from the cardiac flexures to the bulb would therefore stop the pain. The man, seen four years later, professed himself entirely free from the pain, which had been severe and agonizing before the operation. Another case bearing on the point is that of Renon operated on by Tuffier,[7]—a woman of 62 with a fusiform aneurysm of the thoracic aorta. The operator exposed this and bandaged it throughout its length with a long strip of fascia lata. Six years later the patient died of cancer of the uterus. Though not quite free from pain she had been much less troubled by it, and this, as Delorme remarked in discussing the case, may well have been due to division of the peri-aortic nerve fibres in the process of freeing the aorta from the mediastinitis in which it was enveloped.

The value of drugs of the caffeine group in the relief of angina has been further attested by Edgeworth in an unpublished paper on the use of **Diuretin** in patients with angina and low blood-pressure. Some at any rate of the value of these drugs probably lies in the fact stated by Heathcote[8] as the outcome of animal experiments, to the effect that caffeine, theobromine, and theophyllin "have an active vasodilator action on the coronary vessels, probably muscular in origin, caffeine being the weakest and theobromine the strongest." Diuretin, it should be remarked, is theobromine-sodium salicylate.

References.—[1]*Angina Pectoris*, 1920, Moulton, Brighton; [2]*Medical Notes*, 1920, Oxford Medical Publications; [3]*Arch. of Internal Med.* 1921, i. 194; [4]*Presse méd.* 1921, 73; [5]*Ibid.* 17; [6]*Ibid.* 193; [7]*Brit. Med. Jour.* 1921, i, 823; [8]*Jour. Pharmacol. and Exper. Therap.* 1920, Dec., xvi.

ANKYLOSTOMIASIS.

Sir Leonard Rogers, M.D., F.R.C.P., F.R.S.

E. R. Royer[1] found over half the employees under good sanitary conditions in Ecuador infected with hookworms, the proportion being kept up by the admission of new employees, nearly all of those coming from the insanitary low country being infected. In a series of tests the **Oil of Chenopodium** treatment was most effective, but anæmic or feeble patients should be given small doses in the primary treatment, by which means no serious symptoms resulted. S. T. Darling and W. G. Smillie[2] report further on the oil of chenopodium treatment, and as the result of experimental tests conclude that a preliminary purge is unnecessary, while preliminary starvation lessens the efficiency of the drug; but food should not be given coincidently with the drug, as it greatly diminishes its value. A total of 1·5 c.c. in two doses at 7 and 8 a.m. and a saline purge at 10 is quite safe, and when repeated after ten days removes over 97 per cent of the worms. J. F. Caius and K. S. Mhaskar[3], in Madras, report on the chemical and therapeutic properties of certain anthelmintics. Oil of chenopodium varies in its toxicity, and many fatalities have resulted from its use, the literature of which is reviewed. They found its toxicity and therapeutic powers gradually decreased on keeping, and they agree with previous workers that they depend on the presence of ascaridol, which varies in different oils from 45 to 65 per cent. It is rapidly absorbed and eliminated through the kidneys in 24 to 48 hours. They consider 32 min. in one dose, or 48 min. divided into three doses, the optimum amount, which is higher than Darling advises. Owing to the variability of the drug the toxicity of any sample is uncertain, so hospital conditions are advisable to ensure safety. The same workers found wormwood oil (oleum absinthii) and oil of pansy (oleum tanaceti) inefficient as anthelmintics, while oil of turpentine in large doses also completely failed against ankylostomes.

References.—[1]*Jour. Amer. Med. Assoc.* 1920, ii, 1702; [2]*Ibid.* 1921, i, 419; [3]*Ind. Jour. Med. Research*, vii, 570, 602, 606, and viii, 125.

APPENDIX, SURGERY OF. *E. Wyllys Andrews, A.M., M.D., F.A.C.S.*

Etiology.—An exhaustive research into the etiology of appendicitis has been published by Short.[1] Every conceivable factor is tabulated and discussed. Evidence for each theory is presented, and found to be inconclusive. The disease has been increasing in frequency, and this increase cannot be accounted for wholly on the basis of better diagnosis. Many theories are discarded because they cannot explain the sudden increase. He says that nasal or oral sepsis must be ruled out, because no increase in appendicitis occurred during the recent influenza pandemic. The one real fact that will stand this test is the lack of cellulose in the diet. Many tables are given to show that appendicitis is more frequent in those lands where the least cellulose is eaten. In Europe and America, where an increase in the frequency of appendicitis in the decade 1890–1900 has been proved, this increase has been shown to be coincident with a marked decline in the consumption of cellulose. Meat has assumed a much larger rôle in our dietary. The flour now in common use has been so finely milled that there is very little digestive residue, and there has been a great increase in the use of prepared foods of a highly nutritious and concentrated character. Further statistics as to the urban and rural incidence of the disease support this hypothesis. The frequency of appendicitis in apes kept on a diet less coarse than their natural diet in the wild state is remarkable, 10 cases out of 61 post-mortems in one series. It has also been shown that in herbivora fed on a diet ample in all factors except cellulose, an inflammation of the cæcum occurs which often ends fatally.

Treatment.—In view of the general misunderstanding in regard to the *Ochsner treatment* of appendicitis, I would call attention to his recent paper. His ideas never included any hesitancy to operate in the acute stages of the disease. He only recommended that, in those cases where the presence of an acute spreading peritonitis was evident, the operation should be postponed for a few days until the peritonitis had become localized by the Murphy treatment. I will quote in full his indications[2] :—

1. Patients suffering from chronic recurrent appendicitis should be operated on during the interval.
2. Patients suffering from acute appendicitis should be operated on as soon as the diagnosis is made if a competent surgeon is available, and provided they come under treatment while the infectious material is still confined to appendix.
3. Apart from ensuring a low mortality this also will prevent all serious complications.
4. In all cases of acute appendicitis, and in all cases of peritonitis, without regard to the treatment contemplated, the administration of food and cathartics by mouth should be absolutely prohibited, and large enemata should never be given.
5. In case of nausea or vomiting, or gaseous distention of the abdomen, gastric lavage should be employed.
6. In cases coming under treatment after the infection has extended beyond the tissues of the appendix, especially in the presence of beginning diffuse peritonitis, conclusions (4) and (5) should always be employed until the patient's condition makes operative interference safe.

7. In case no operation is performed, neither nourishment nor cathartics should be given by mouth until the patient has been free from pain and otherwise normal for at least four days.

8. During the beginning of this treatment, not even water should be given by mouth, the thirst being quenched by rinsing the mouth with cold water, by the use of small enemata, and by chewing wax or paraffin. Later, small sips of very hot water frequently repeated may be allowed, and still later, sips of cold water. There is danger in giving water too freely, and there is great danger in the use of large enemata.

9. All of these cases are greatly benefited by the use of continuous normal salt solution by rectum, given by the very slow drop method according to Murphy's directions.

10. All practitioners of medicine and surgery, as well as the general public, should be impressed with the importance of prohibiting the use of cathartics and food by mouth, as well as the use of large enemata, in cases suffering from acute appendicitis or peritonitis.

11. It should be constantly borne in mind that even the slightest amount of liquid food of any kind by mouth may give rise to dangerous peristalsis, and change a harmless circumscribed into a dangerous diffuse peritonitis.

12. The most convenient form of rectal feeding consists in the use of one ounce of any of the various concentrated liquid predigested foods in the market, dissolved in three ounces of warm normal salt solution, introduced slowly through a soft catheter, inserted into the rectum a distance of two or three inches.

13. This form of treatment cannot supplant the operative treatment of acute appendicitis, but it can and should be used to reduce the mortality by changing the class of cases with spreading peritonitis, in which the mortality is very high, into chronic appendicitis, in which it is very low after operation.

14. It is important to bear in mind the fact that this treatment is always indicated in every case of acute appendicitis without regard to whether an immediate operation is or is not contemplated.

15. It is important, too, not to be deceived, by the very rapid improvement of what appear to be serious cases after introducing this treatment, into the belief that the case is not a gangrenous or perforative appendicitis, because such patients may easily be killed by giving food too early.

For a number of years we have placed all of these patients in the Fowler position, and have applied large hot fomentations of saturated solution of boric acid, held in place by an abdominal binder. Over this dressing we have placed an electric light in the form of a so-called therapeutic lamp. These methods seem to add to the comfort of the patient.

Behrend,[3] although he says most emphatically in his paper that he does not use the Ochsner treatment, admits that in some cases he has the patient put to bed, food and drink withheld, morphine administered, and proctoclysis given. This is done for a few hours and improvement noted, and the operation is better borne. To our mind this illustrates the same point, and perhaps if the operation were postponed still longer the benefit would be even greater in such cases of spreading peritonitis.

Battle[4] presents a series of 1000 cases of appendicitis operated during a quiescent period. This is certainly the ideal time for surgery, as is shown by the results. There were but two deaths. But one hernia was noted after the operation. The advantages of the Battle incision are discussed, and particular emphasis is laid on the point that in many cases our diagnosis is faulty or incomplete and other parts of the abdomen must be reached. With this incision the enlargement can be easily and safely made in any direction, much more easily than with a muscle-splitting incision. The following is a table of the pathology found at the operations :—

STATE OF THE APPENDIX IN ONE THOUSAND CASES OF REMOVAL IN THE QUIET PERIOD.

Condition found	Male	Female	Ages 10	20	30	40	50	60	Over 60	Total
Apparently normal ..	4	3	—	4	2	1	—	—	—	7
Hypertrophy	1	—	—	—	1	—	—	—	—	1
Obliterative inflammation	6	10	1	1	2	3	7	2	—	16
Catarrhal	242	269	25	153	201	72	43	16	1	511
Stricture	183	134	21	59	128	65	35	9	—	317
After abscess	71	74	14	41	45	32	8	2	3	145
Tubercle	—	2	—	1	1	—	—	—	—	2
Carcinoma	—	1	—	1	—	—	—	—	—	1
Totals	507	493	61	260	380	173	93	29	4	1000

An interesting contrast is seen in Bancroft's[5] review of 585 cases operated in the acute stage. There were 25 deaths, or 4·2 per cent, as against 0·2 per cent in the above series. The following table of complications is especially instructive, when we consider that they were almost entirely absent in Battle's series of quiescent cases :—

MOST IMPORTANT COMPLICATIONS AND SEQUELÆ.

	Non-drained Cases		Drained Cases	
	No.	Per Cent	No.	Per Cent
Secondary abdominal abscess	4	1·6	21	6·2
Post-operative hernias ..	4	1·9	49	15 0
Average days in hospital ..	10		19	

Drainage seems to be the most important factor in the etiology of post-operative hernia. Only 4 hernias were observed among 205 undrained cases, and 45 among 295 drained cases. The McBurney incision was followed by 14 per cent of hernias, and the right rectus by 21 per cent. The mortality was shown to be very much higher in the very young and very old, being about 1 per cent from twenty to thirty.

The advantages of the various *incisions* in appendicitis are discussed by Lake,[6] who seems to favour a right rectus incision near the mid-line with the muscle retracted outward. He thinks that the Battle and McBurney incisions are too limited and do not give room to explore the abdomen or reach other parts secondarily involved. [The reviewer differs radically from this view. One should no longer be in such doubt as to the diagnosis that it is necessary to expect many errors. The McBurney incision makes appendectomy almost a minor operation. The patient can even be allowed out of bed in a day or two with no fear of hernia unless the wound is infected. This should be the incision of choice in all cases except where one expects to encounter difficulties of high grade. In that case an inner rectus or mid-line incision can be made.—E. W. A.]

REFERENCES.—[1]*Brit. Jour. Surg.* 1920, Oct. ; [2]*Therap. Gazette,* 1921, Feb. 15 ; [3]*Ibid.* March 15 ; [4]*Lancet,* 1921, Feb. 12 ; [5]*Jour: Amer. Med. Assoc.* 1920, Dec. 11 ; [6]*Lancet,* 1921, Feb. 5.

ARGYLL ROBERTSON PUPIL. *J. Ramsay Hunt, M.D.*

Kinnier Wilson[1] gives an interesting review of this symptom ; fresh evidence is furnished pointing to its central origin, and a new and simple explanation is proffered for its common occurrence in neurosyphilis. Strangely enough, doubt still exists as to what actually constitutes the Argyll Robertson pupil. Present-day opinion, however, with few exceptions, holds myosis to be facultative and not obligatory, so that the sign may be defined as consisting in absence (or obvious diminution) of the direct reflex to light, the consensual reflex being either absent or present, with preservation of the pupillary reaction on convergence-accommodation. That this is the soundest view to take is substantiated by the fact that myosis may occur without the dissociated-reflex phenomenon of the Argyll Robertson pupil, and vice versa, and since two different mechanisms are involved they should be considered separately. A frequent but not perhaps constant correlated feature of the Argyll Robertson phenomenon is absence of dilation of the affected pupil on painful stimuli from the trigeminal area or elsewhere. Irregularity or inequality of the pupils in the condition is incidental. The paper should be consulted in the original : it is of considerable value, but is difficult to summarize in the space at our disposal.

Reference.—[1]*Jour. Neurol. and Psychopathol.* 1921, May, 1.

ARSENIURETTED HYDROGEN POISONING. (*See* Poisoning.)

ARSPHENAMINE. (*See* Drug Eruptions.)

ARTERIAL TENSION, HIGH. *Carey F. Coombs, M.D., F.R.C.P.*

What is a Normal Blood-pressure?—Alvarez[1] sought an answer to this question by systematic observations on University students in the Western States. He finds the systolic pressure at such ages to average 120 to 130 mm. Hg in men and 110 to 120 mm. Hg in women. In his view a systolic pressure of 150 mm. Hg in a young man or of 140 in a young woman is probably symptomatic of disease. He found that the average pressure in women rose from the ages of 16 to 17, then dropped to 25, and afterwards rose rapidly to 40.

Wheelon[2] conducted a somewhat similar investigation of a more intensive character on 66 normal medical students and 22 aged women. In the former the average systolic pressures were found to be 116 mm. Hg (recumbent), 120 mm. (sitting), 122 (standing), and 139 mm. after five minutes' exercise. What is more interesting is that the range of these pressures, extending already from 92 to 150 mm. for the recumbent position, widened out to 115 to 196 mm. following exercise. This serves to illustrate the fact that normal individuals differ widely from each other not only as to their average pressures but also as to the extent to which the pressure is modified by circumstances. The same thing is true, of course, of heart-rate, as Wheelon showed by exposing his normals to various stimuli. For example, sipping water accelerated the heart in 59 men and retarded it in 7. The same kind of lesson is taught by Enebuske,[3] whose careful researches prove that the response to reflex stimulation varies widely in normals not only as to pulse-rate but also as to blood-pressure itself.

Crampton[4] has investigated the influence of posture on blood-pressure in normal persons and in invalids. His main conclusions are that signs of an inefficient circulation are a fall in systolic pressure and a rise in heart-rate when the patient changes from the recumbent to the standing position. From these two factors he proposes to determine an index of circulating efficiency, and seeks to apply this index to all sorts of problems ; stating, for example, that " a sudden drop in the index may mark the onset of acute disease before any other symptom is present ".

The fact that emerges from a consideration of all these researches is that the normal arterial tension is the resultant of a great many diverse forces, operating with extraordinary rapidity and power but nevertheless co-ordinated so as to bring about a remarkably steady result. It is wise, therefore, to standardize so far as possible the conditions under which one measures the blood-pressure, so that reading may fairly compare with reading. Further, it is useless to lay much stress on minor variations in pressure. A sustained abnormality in pressure—one observed whenever the patient is examined—is significant, but a single high or low reading, unless it is very pronounced, and clearly supported by collateral evidence, is not an adequate basis for a diagnosis.

Treatment—For many years it has been an axiom of treatment that a high arterial tension is an indication for **Restriction of the Protein Element in Diet.** Possibly because of the recent discovery of the value of a high protein intake in some cases of chronic nephritis, this creed is now being critically examined. Mosenthal's[5] observations on a series of patients with various types of chronic nephritis show that it is exceptional for a low protein diet to diminish the blood-pressure or a high protein diet to raise it. It is an undoubted fact that general over-eating does send up the arterial tension. Those who eat too much of everything are nearly always gross protein feeders, and this may have been to some extent responsible for the general belief in the harmfulness of a high protein diet.

An alternative dietetic policy is that expounded by Allen and which has been recently supported by J. H. Musser.[6] The theory on which it is based is that in many cases the high pressure is a compensating process designed to force water and salts through damaged renal glomeruli. In such cases the indication is to reduce the intake of water and salts. Musser has applied this method to seven cases with good results. At the same time he has tested various drugs, including benzyl benzoate, but without success. He recommends **Electric Cabinet Baths,** or a fifteen minutes' **Warm Bath** at a temperature of 103°, twice a week. Field[7] speaks highly of the value of **Radium** intravenously or by mouth.

In relation to all these plans of treatment certain facts have to be borne in mind. First, there is the evidence brought forward by many workers, among them by J. L. Williams,[8] to prove that there is such a thing as hypertension, of a degree and a persistence that can kill its victim, without renal lesions of any importance. Second, there is without question a strong element of heredity in many such cases. Alvarez[1] alludes to this, and thinks we might detect potential hyperpietics in childhood and order their lives accordingly. Possibly he is right. But the psychical element must not be lost sight of. It may be that the hereditary element in hyperpiesis is a psychical factor ; certain families are subject to hyperpiesis because they are of an emotional cast. If good is to be done to the child with an inborn tendency to high arterial tension it must include, and indeed consist largely of, training calculated to steady the emotions and reduce to a minimum the anxious, troubled frame of mind that is so powerful a factor in raising the blood-pressure.

To this may be added the words of Graham Stewart[9] warning us against too grave a view in the hyperpiesis of war and other psychoneuroses : "In such functional cases, the use of vasodilators is strongly contra-indicated. The **Bromides** (10 to 15 gr. of the sodium salt three times daily), the occasional use of **Ammonium Hippurate** (5 to 7½ gr. two or three times daily), rest, gastro-intestinal purification, and superficial psychotherapeutic treatment are the means found the most useful in securing good results. The prognosis is definitely and uniformly good. It is almost unnecessary to say that the more psychoneurotic the patient, the less should she hear of the ominous-sounding 'blood-pressure' ".

References.—[1]*Arch. of Internal Med.* 1920, ii, 381; [2]*N. Y. Med. Jour.* 1921, i, 505; [3]*Boston Med. and Surg. Jour.* 1921, i, 407; [4]*Amer. Jour. Med. Sci.* 1920, ii, 721; [5]*Ibid.* 808; [6]*N. Y. Med. Jour.* 1920, ii, 570; [7]*Med. Record,* 1920, ii, 1051; [8]*Arch. of Internal Med.* 1921, i, 748; [9]*Practitioner,* 1921, Sept.

ARTERIOSCLEROSIS. (*See also* Eye Affections.)

Carey F. Coombs, M.D., F.R.C.P.

Etiology.—Evans's[1] prolonged histological studies have brought to light valuable evidence in favour of the view that arteriosclerosis is an inflammatory process, probably evoked by bacterial intoxication. In the earlier decades the effect of the toxins is to produce a smart intimal reaction, but in elderly persons the degenerative side of the reaction is the more obvious; possibly because the intima loses 'vitality' as it grows older. The relation between chronic renal disease and arteriosclerosis is that both are due to a common cause, i.e., injury by bacterial toxins. Ophüls,[2] as a result of somewhat similar researches, comes to the same conclusions. He thinks, further, that these tissue changes are due more often to chronic septic and rheumatic infections than to any other agent.

Treatment.—Norman,[3] in accordance with the infection hypothesis of arteriosclerosis, proposes an elaborate plan of treatment based on the abolition of all sources of infection and including courses of **Bowel Lavage,** the technique of which is described in extraordinary detail. [But it may be doubted whether even in the twentieth century it is possible by taking thought to add a cubit to one's stature. More can be done to ensure longevity by conserving the vitality of the tissues (reducing to a minimum the katabolic effects of hurry and worry) than by an anxious warfare against the bacteria which infest our bodies from the cradle to the grave.—C. F. C.]

References.—[1]*Quart. Jour. Med.* 1921, Apr., 215; [2]*Jour. Amer. Med. Assoc.* 1921, i, 700; [3]*N. Y. Med. Jour.* 1921, i, 751.

ARTHRITIS. (*See* Non-specific Protein Therapy; Rheumatism and Gout.)

ASCARIASIS.

Herbert French, M.D., F.R.C.P.

Literature published during the past year draws attention to the possible dangers of this condition. Formerly the *Ascaris lumbricoides* has been regarded as a harmless intestinal parasite to which only transient and slight indefinite symptoms, if any, could be attributed. The life history has been fully worked out, and it is recognized that no intermediate host is necessary. The eggs are not infective until the contained embryos develop to a vermiform stage, which requires a period of fourteen days or more. They are extremely resistant to cold and dryness, while Yoshida[1] has shown that formaldehyde, sulphuric acid, hydrochloric, nitric, or glacial acetic are not able to penetrate the ova sufficiently to destroy the embryo or render it incapable of developing. The eggs are swallowed, and hatch in the small intestine, whence the larvæ migrate to the liver and remain for a few days. They then pass on to the lungs by way of the hepatic veins, inferior vena cava, heart, and pulmonary arteries. In the lungs they enter the alveoli, thence the bronchi and the trachea, whence they reach the œsophagus, and finally the small intestine, where if the host is suitable they establish themselves and develop to maturity. If the ova are injected beneath the skin of a host, they not only hatch, but the larvæ later appear in the lungs and follow the same course as though they had been swallowed.

Ransom,[2] who has performed many experimental investigations on animals, observed that infected rats and mice commonly die of pneumonia a week or ten days after infection, and so do guinea-pigs and rabbits. Larger animals such as young pigs, if heavily infected, may likewise die. By analogy it is reasonable to suppose that ascaris may occasionally, if not frequently, produce a similar pulmonary disease in young children, who are known to be very susceptible to infection. Two German observers in 1867 and in 1888 experimentally infected human beings, and in some of these cases they recorded fever and difficulty in breathing a few days after the eggs were given to the subjects.

Crowell[3] goes fully into the question of the dangers of ascariasis. He classifies the pathological effects as follows :

1. *Mechanical.*—Enormous numbers of the worms may form a mass anywhere in the intestine and cause tumour formation, palpable and likely to give rise to errors in diagnosis where the condition is not suspected. A case which passed 600 worms in one day is recorded. Such a mass may cause not only constipation but complete obstruction. Lodged in the appendix they may give rise to the symptoms of appendicitis, and he records several cases in which, when the appendix was removed, an ascaris was found, but none of the pathological changes of appendicitis were present. The habit of the worm of forcing its way through any minute opening leads to obvious danger in surgical conditions where resection or stitching of the bowel has had to be performed in infested subjects. He records one case in which a diffuse peritonitis was caused and spread by this means. This predilection of the worm again is a possible cause of fistulas which remain after the passage of the worms. Migration into the common bile-duct and thence into the gall-bladder and intra-hepatic bile-ducts is a frequent occurrence. Occlusion of any of the ducts by the presence of one or more worms may give rise to all degrees of trouble, from jaundice and colic to cholangitis or liver abscess. Several cases are recorded, in one of which a subdiaphragmatic abscess, secondary to a superficial liver abscess caused by ascaris, had formed and caused a right-sided empyema. Migration of the ascaris to the mouth or nose is extremely frequent, and its passage into the larynx may cause suffocation.

2. *As a Carrier of Infection.*—During the migrations infection may be carried by the worm to the liver and the bile-duct or into the general peritoneum as recorded above.

3. *Bronchopneumonia.*—A result of the presence of larvæ in the lungs.

4. *Toxic and Reflex Nervous Effects.*—Little is known of these at present, but a long array of symptoms are attributed to ascaris, such as fevers, nausea, flatulence, abdominal pains, convulsions, tetany, choreic symptoms, hysteria, epilepsy, delusions, hallucinations, and symptoms resembling those of meningitis ; all these have been known to occur in those infested with ascaris, and to disappear after its successful treatment.

REFERENCES.—[1]*Japan Med. World,* 1919, Aug. 31, 298 ; [2]*Jour. Amer. Med. Assoc.* 1919, Oct. 18, 1210 ; [3]*Amer. Jour. Med. Sci.* 1920, March, 380.

ASCITES.

Herbert French, M.D., F.R.C.P.

DIAGNOSIS.—Halban[1] states that he finds it more easy to demonstrate the presence of small amounts of fluids in the abdomen when the patient is erect than when he is recumbent, in which position small quantities of fluid are distributed throughout the abdomen. In the erect position the fluid gravitates downward, thus forming a single mass with a horizontal surface which may be plainly demarcated.

REFERENCE.—[1]*Centralb. f. Gynäkol.* 1920, Aug. 28.

ASTHMA, BRONCHIAL. (*See also* Non-specific Protein Therapy.)

Arthur Latham, M.D., F.R.C.P.

Etiology.—Murray Peshkin[1] describes a case of asthma in a chemist, and shows that it was definitely due to the inhalation of powdered ipecacuanha, engrafted on a recurrent seasonal bronchitis. In addition to positive cutaneous tests for ipecacuanha, this patient gave positive cutaneous tests to several types of food, none of which had any bearing on the complaint. The case is of interest in showing the necessity of making a detailed inquiry into the occupation and surroundings of anyone suffering from asthma.

A study of 150 cases leads Piness[2] to state that asthma is a clinical manifestation produced by protein sensitization. Heredity is an important predisposing but not exciting factor in from 25 to 50 per cent of the cases. Climate has very little bearing on the etiology excepting in the pollen and asthmatic bronchitis types. Eczema, urticaria, and angioneurotic œdema have definite relationship to the protein-sensitive asthmatics. It is possible with cutaneous tests to determine the etiology of bronchial asthma in from 47 to 50 per cent of cases. Multiple sensitization is common, particularly in the food and pollen groups. Sensitization to one protein in early life is apt to be followed by sensitization to other proteins. Renal and cardiac diseases may complicate asthma, but the latter is a distinct and separate condition, not dependent on the former. Patients with a history of onset past 35 years of age rarely give positive skin reactions, but serum agglutination tests to *Staphylococcus pyogenes aureus* occasionally give positive reactions and determine the cause. There is no fixed relationship between cutaneous reaction, serum agglutination tests, and isolation of *Staphylococcus aureus* from sputum or nasal secretions.

It must be remembeted that endocrine dysfunction bears a prominent part in the etiology of asthma, particularly in the case of younger individuals, and should be borne in mind where the patient does not respond to specific protein treatment.

References.—[1]*Jour. Amer. Med. Assoc.* 1920, Oct. 23, 1133; [2]*California State Jour. of Med.* 1921, Jan., 19.

AURICULAR FIBRILLATION.

Carey F. Coombs, M.D., F.R.C.P.

'Heart failure' is myocardial failure, i.e., inability on the part of the heart muscle to fulfil the task demanded of it. One form of myocardial failure is that known as 'auricular fibrillation', a failure characterized by fibrillary and inco-ordinate action of the auricle replacing its normal systole.

Etiology.—Drachman,[1] analyzing 400 cases exhibiting auricular fibrillation, found the sex incidence approximately equal. More than half the patients came between the ages of 41 and 60. In about 40 per cent there was a history of acute rheumatism or chorea or both. In a small but definite group Graves' disease was responsible for the myocardial disease. The bulk of the cases are accounted for either as cases of mitral stenosis or of progressive myocardial degeneration, the two groups being roughly equal.

Pathology.—In last year's Medical Annual some account was given of the recent researches of Lewis and his assistants into the essential processes of that form of auricular failure which manifests itself in 'fibrillation'. These researches have been summarized by Lewis in his Oliver-Sharpey Lectures[2] in a form easy to understand. The main fact is that in auricular flutter and also in auricular fibrillation the normal spread of the excitation stimulus is replaced by what is termed by Lewis a 'circus movement' (*Figs.* 1–4). In the normal heart the stimulus by which the heart is provoked to an orderly contraction arises at the sinu-auricular node, at the junction of the superior vena cava with the right auricle. Thence it spreads throughout the auricular musculature, concentrically, like " the ripple on the surface of a pond into which a pebble is thrown ". From all parts of the auricular musculature it is collected together for transmission to the auriculoventricular connections, and thence to the ventricular walls. Apparently as a result of progressive degeneration of the auricular walls, this sequence is disturbed in both flutter and fibrillation. A circus movement of the stimulus and its results is set up. The stimulus chases itself endlessly round a circle which enwraps the orifices of the venæ cavæ, casting off tangentially centrifugal stimuli into the remainder of the auricular walls. This round-and-round course of the stimulus can be maintained over indefinite periods so long as the stimulus, ever advancing round the ring, finds in front of it some fragment of muscle which has recovered from its last stimulation and is ready to receive a new stimulus. If the ring path

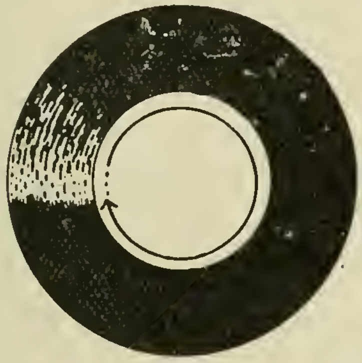

Fig. 1.—A schematic representation of the excitation wave as it circulates in flutter. The blackened portions of the ring represent those portions of the muscle which are refractory at a given instant. The crest of the wave travels constantly through muscle in a partially refractory state. The border of the advancing wave is finely serrated.

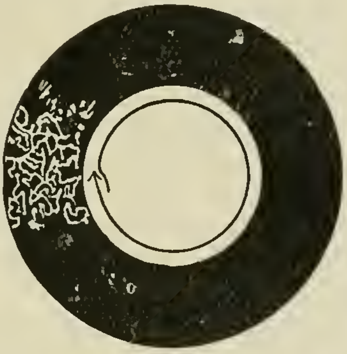

Fig. 2.—A similar representation of the excitation wave as it circulates in fibrillation. The advancing border and retreating wave are deeply crenated, and these crenations overlap. The wave is constantly advancing through small and irregular channels of responsive tissue as these open to receive it.

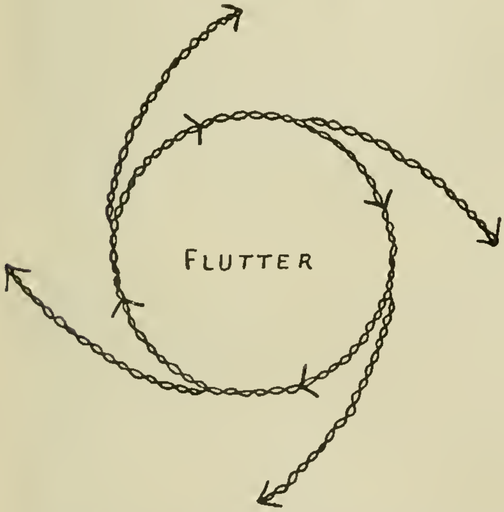

Fig. 3.—A diagram illustrating the successive paths followed by the excitation wave in flutter. The path is finely sinuous, but is in general accurately repeated from cycle to cycle.

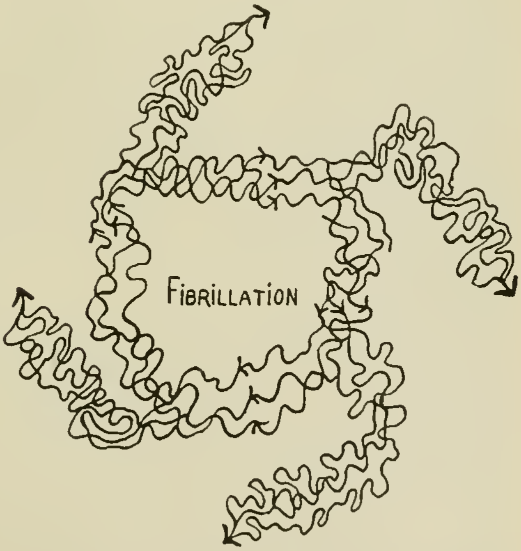

Fig. 4.—A similar diagram of the successive paths taken in fibrillation. The path is coarsely sinuous and ever-varying, though it continues to progress in a clockwise fashion around a central area.

were too short, or the wave of stimulus and consequent contraction travelled too fast, the muscle would not get over its lost stimulation before another would be on it. As a result the muscle would refuse to contract or to transmit the stimulus, the ring would be a continuous band of 'refractory' muscle, and the circus movement would come to an end. In the same way, anything which makes the cardiac muscle more refractory, i.e., slower at getting through its active phase and back to its resting or responsive condition, will tend to 'close the ring' and bring the circus movement to an end.

The difference between the circus movement of flutter and that of fibrillation is mainly one of degree. *Figs.* 1–4 serve to illustrate the highly ingenious arguments developed by Lewis, while for further details the original articles should be consulted.

Diagnosis.—Auricular fibrillation is a very common form of arrhythmia, and it is not possible that graphic methods of analysis should be available in every case; nor is it necessary. Attention to the points enumerated by Cornwall[3] in the paragraph that follows will nearly always ensure a correct diagnosis, graphic methods coming to the rescue in such cases as remain doubtful.

"Auricular fibrillation can usually be identified by the rapidity of the heart's action and its absolute irregularity. The ventricular rate is usually over 90, and the beats are absolutely irregular in time and force. Often the apex beats are considerably more numerous than the pulsations at the wrist, because many of the former are too feeble to send a pulse-wave to the wrist. Any irregular ventricular rate above 120 is most likely to be auricular fibrillation. If the ventricular rate is slower than 90, which is comparatively rare in this condition, recognition may not be so easy; but close observation usually reveals the fact that the heart action is never quite regular; and the other signs and symptoms of organic disease of the heart, particularly mitral stenosis, are usually present to strengthen the diagnosis. Short presystolic murmurs are apt to disappear when there is fibrillation, but long, rough murmurs usually persist. Auricular fibrillation can be differentiated from heart-block and premature contractions with marked ventricular irregularity, by the fact that moderate exercise increases the irregularity in fibrillation and diminishes it in the other two conditions. Auricular fibrillation is also usually a permanent condition."

Prognosis.—The point made by Drachman to the effect that the outlook in any given case of which auricular fibrillation is a feature depends largely on the condition of the ventricles is in agreement with the present writer's experience.[4] It is doubtless this fact that accounts for the difference between the general capacity of the fibrillating heart in cases of mitral stenosis, as compared with cases of progressive myocardial degeneration showing the same form of auricular breakdown. In the former condition the patient may live for a decade with a totally irregular heart. In the latter, the onset of fibrillation usually foreshadows death within a year or two. The reason for this difference lies in the fact that in chronic mitral disease of the post-rheumatic type, the ventricles are often in pretty good condition, whereas in the progressive myocardial degenerations the ventricular muscle is usually as bad as the auricular. When fibrillation sets in with its rapid irregular stimulation of the ventricle, the latter, if diseased and already inefficient, finds itself suddenly deprived of much of the diastolic rest on which it was just managing to carry on, and the result is a ventricular breakdown which if not immediately fatal is at least highly dangerous.

Very seldom one comes across cases in which, for no apparent reason, the action of the heart assumes the characteristics of the auricular fibrillation syndrome—total arrhythmia and all the rest of it—and behaves so for a period of hours or days ; then returns to the normal and continues so to act for the rest of a life of average length. Such occurrences are rare, and the gulf between these, and the more usual course of events summed up in the old term 'perpetual arrhythmia', is bridged by cases in which the heart, after one or two transient periods of irregularity, settles down to it without intermission for the rest of life.

Treatment.—Two recent papers set on a firmer basis the employment of **Quinidine** in auricular fibrillation to which allusion was made in the Medical Annual for 1920. In the first, Drury and Iliescu[5] describe their experience of the drug in 13 cases. In 6 of these the result was successful, restoring the normal rhythm completely and with apparent permanence. The total dose varied from 0·8 to 6·6 grm., given in doses of 0·4 grm. each, in gelatin capsules, by the mouth. The second paper, by Lewis, Drury, Iliescu, and Wedd[6] attempts an analysis of the action of quinidine on the fibrillating auricle. According to them it 'closes the ring' around which the wave of stimulus and contraction is circulating (round the caval orifices) by lengthening the refractory period of the auricular muscle. Lengthening of the refractory period closes the ring by slowing the recovery of the muscle that has contracted so much that before it is complete the wave of stimulation has come round again. Coming round as it does under such conditions, it finds itself checked by a wall of still refractory muscle, and as a result the 'circus' movement comes to an end. This movement being the foundation of the fibrillating state, this latter comes to an end also. The fact that quinidine fails about as often as it succeeds they ascribe to its other action—a slowing of conduction. If the conduction of the stimulus be delayed it gives the refractory muscle longer to recover. In some cases this effect will predominate over that which lengthens the refractory period of the muscle, the 'ring' will remain 'open', the 'circus' movement will continue, and the auricle will go on fibrillating. It seems quite impossible to predict from the clinical features which action is likely to have the upper hand in a particular case. These writers warn us against indiscriminate use of quinidine, since so powerful a drug needs to be carefully watched, at all events while it is still in the experimental stage. Ellis and Clark-Kennedy[7] utter a similar caution. The use of quinidine restored the normal rhythm in 5 out of 7 cases of fibrillation observed by them ; but in two the reawakened auricle despatched its clot as emboli into internal organs, and in one the abnormal rhythm relapsed when the administration of the drug was stopped. Interesting critical reviews by Meldolesi[8] and Cheinisse[9] give support to this warning by showing how diverse have been the experiences of some of the continental observers. Some have succeeded in 50 per cent or more of their cases in terminating fibrillation, but others have had only 10 per cent of successes. And we must recollect, in the terms of Cheinisse's quotation from Wybauw, that the stage of total arrhythmia is generally the terminal phase of a chronic cardiac lesion ; that before the inception of this arrhythmia there are often grave symptoms ; that therefore the cure of the arrhythmia is not going to get rid of such symptoms. The same writer also remarked that the subjective relief afforded by these means is less dramatic than that of digitalis.

▶ Some account was given in last year's Medical Annual of the new American dosage of **Digitalis**—the massive initial dose proportioned to the patient's body-weight. This will also be referred to elsewhere in the current volume (*see* Heart Disease, Treatment), but the writer would like to draw attention here to the value of the large-dose method of giving digitalis to patients in the auricular fibrillation stage of cardiac failure. Doses of 1 drachm of the tincture given every four hours for one day, followed by $\frac{1}{2}$-drachm doses for two to six days, will afford relief and even save life in a degree unattainable by the customary smaller dosage.

REFERENCES.—[1]*Lancet*, 1921, i, 374 ; [2]*Ibid.* 785, 845 ; [3]*Med. Record*, 1921, i, 43 ; [4]*Index of Prognosis*, John Wright & Sons Ltd., Bristol, 1918 (2nd ed.), 602 ; [5]*Brit. Med. Jour.* 1921, ii, 511 ; [6]*Ibid.* 514 ; [7]*Lancet*, 1921, ii, 894 ; [8]*Policlinico (sez. prat.)*, 1921 March, 330 ; [9]*Presse méd.* 1921, 426.

BACILLURIA. (*See* COLI BACILLURIA.)

BALANOPOSTHITIS. (*See* FOURTH VENEREAL DISEASE.)

BALANTIDIOSIS.

Sir Leonard Rogers, M.D., F.R.C.P., F.R.S.

F. W. Haughwout, E. Domingo, and W. de Leon[1] record an acute case of dysentery due to the *Balantidium coli* treated with **Benzyl Benzoate,** beginning with 10 drops of 20 per cent alcoholic solution given in water three times a day, increased after two days to 15-drop doses, and to 20 drops after another four days ; two days afterwards swarms of vigorous balantidia were present in the stools, but were few and degenerate a week later. The patient died two weeks after with lung complications, having been extremely exhausted when the treatment was commenced. A minute microscopical examination of the tissues obtained shortly after death showed no trace of balantidia, while the patient died of causes unrelated to the balantidium infection.

REFERENCE.—[1]*Philippine Jour. Sci.* 1920, 633.

BILHARZIASIS. (*See* SCHISTOSOMIASIS.)

BILIARY PASSAGES. (*See* GALL-BLADDER AND BILIARY PASSAGES.)

BLACKWATER FEVER.

Sir Leonard Rogers, M.D., F.R.C.P., F.R.S.

L. S. Dudgeon[1] records important observations on the blood changes, and microscopical changes in the organs, in numerous blackwater fever cases seen in the Balkans, which once more confirm the now very generally accepted malarial origin of this affection. True jaundice with bile pigment in the plasma occurred in most fatal cases, while varying degrees of hæmoglobinæmia occurred in the acute stages without any evidence of autohæmolysis or increased fragility of the red cells. In hundreds of cases a malarial history was uniformly obtained. The tissues showed fatty degeneration of the myocardium ; reduction of the fat lipoid content of the adrenal gland ; endothelial cell enlargement of the Malpighian corpuscles of the spleen ; recent or chronic perisplenitis in addition to malarial changes in that organ ; hæmorrhages and foci of necrosis in the liver with inspissation of the bile ; and in the acute stages the kidneys showed pronounced changes, with scattered hæmorrhages. Active hæmolytic substances were extracted from the dried residue of the urine and from dried organs by means of alcohol and acetone, especially the latter solvent, although dried viscera from cases other than blackwater fever failed to show them. No evidence could be obtained that quinine influenced the severity or progress of an attack except by its effect on malaria, or that blackwater fever is in any way related to anaphylaxis.

A. Goodall[2] tabulates 14 cases of blackwater fever, in 12 of which malignant tertian parasites were found, and he strongly supports the malarial nature of the disease, although cold may predispose to an actual attack. Large doses of **Quinine** intravenously were used with good results, 12 out of the 14 recovering.

TREATMENT.—J. C. S. Vaughan[3] records promising results in malaria and blackwater fever from the use of a new remedy, a watery extract of the leaves of **Vitex Peduncularis,** a plant growing in the Chota Nagpur province of India, where it has for long been used by the indigenous inhabitants for fever. The infusion is made with 1, 2, or 4 oz. of the leaves in 40 oz. of boiling water, and is given in 8 to 10 oz. of the 1–40 infusion in twenty-four hours, being quite free from toxicity. Some 60 cases of malaria, nearly all verified microscopically, have been treated with similar results to those got with quinine, while in several cases of blackwater fever the urine became clear within about thirty-six hours and recovery took place. The active principle has not yet been isolated, but it is hoped that with further study the new drug may prove a useful substitute for quinine. J. H. Douglas and H. Carlton[4] record a single case of blackwater fever recovering after the administration of **Pancreatic Amylopsin** and **Trypsin,** in which they think this treatment was of service.

References.—[1]*Jour. of Hygiene*, 1920, Oct., 208: [2]*Brit. Med. Jour.* 1920, ii, 697 [3]*Ibid.* 1921, i, 186; [4]*Jour. R.A.M.C.* 1921, Feb., 135.

BLADDER, DISEASES OF.

(*See also* Bladder, Growths of; Epispadias and Ectopia Vesicæ.)

Sir John Thomson Walker, F.R.C.S.

Hernia of the Bladder.—Heinock[1] relates his experience of 159 cases. The condition may be congenital or acquired, and is almost invariably unilateral. In the female the condition does not interfere with gestation or disturb parturition. The hernia may occur in the linea alba, obturator, femoral, or inguinal regions. The following anatomical varieties occur: intestinal or intraperitoneal, direct or indirect, complete or incomplete, pudendal or scrotal, infraperitoneal, paraperitoneal, and extraperitoneal. The etiological factors concerned in vesical hernia are: (1) All conditions tending to increase intra-abdominal pressure; (2) All conditions, congenital or acquired, that weaken the abdominal wall; (3) All diseases of the lower urinary organs that reduce the expulsive force of the bladder or obstruct the outflow of urine; (4) Pre-existing hernias. The bladder may be the sole content of the hernial swelling, or one of several contents. Truss treatment is not curative, and may injure the bladder wall. All hernias of the bladder should be operated upon, and the operation is curative and free from danger. The modern hernia operations permit a full view of the hernial rings, canals, and surrounding structures, so that the prolapsed bladder rarely escapes attention. Resection of the hernial bladder process is only indicated in exceptional conditions, and the bladder should be immediately repaired. During hernia operations, the wounding of the urinary bladder may be prevented by operating carefully and keeping the possibility of hernia of the bladder in mind. The prognosis of wounds of the bladder during hernia operations is good if they are repaired immediately, and the bladder is drained by catheter afterwards. If the catheterized urine contains blood within twenty-four or forty-eight hours after a hernia operation in a healthy subject, the origin of the blood should be ascertained. If a bladder injury is present, the operation wound is opened or laparotomy performed.

Urinary Incontinence.—Hernaman-Johnson[2] discusses the treatment of this condition by **Electrical Methods.** Interrupted currents are used to produce a rhythmical contraction of the abdominal muscles. The high-frequency condenser-electrode is inserted into the rectum. These methods both aim at increasing local and general tone, and should always be employed for some weeks before more drastic treatment is tried. If there is no improvement in ten days, suggestion treatment should be added. Internal application may be carried out by introducing a metal bougie into the bladder and passing a faradic current through it up to the patient's limit of tolerance. A second method is to fill the bladder with a weak solution of zinc sulphate and pass into the bladder a rubber catheter containing a wire of soft metal. Care should be taken that the wire does not come in contact with the bladder or urethral wall. A pad is placed under the buttocks for the negative pole. A circuit of 10 to 15 ma. is passed for ten minutes and then repeated every other day for a fortnight. This method may produce irritation without in any way benefiting the incontinence.

Diverticulum of the Bladder.—Blum[3] records 3 cases. In 2 it was possible to remove the diverticulum by the transvesical route. In the third oase this was impossible owing to old adhesions. The diverticulum was therefore excluded, and after exocochleation the sac was caused to atrophy by suprapubic drainage. The author has operated altogether on 9 cases. In 7 of these cure was effected, 1 recurred, and 1 died after six months from chronic pyelonephritis.

Watson[4] points out that at the present time opinion is divided as to whether diverticula of the bladder are congenital or acquired. He suggests the view that there is a developmental basis for certain vesical diverticula. Irregularity in the intrapelvic and lower abdominal pressure has been noted, and has caused the bladder to become somewhat distorted, and the inner walls to become very irregular, particularly in the basal zone and the lateral margin of the trigone. These irregularities, augmented by the general processes of growth, may project into the vesical cavity as definite finger-like invaginations. If the intrapelvic pressure increases early in fœtal life, the probability of bridging the vesical cavity is greater than if it develops later. In certain instances when the pressure is more lateral, the invaginations form bridges along the side of the bladder. The mucous layer, however, continues across such a bridge, and a true pocket is formed, the wall of which contains the muscular, submucous, and mucous coats of the bladder wall.

Urinary Calculus.—Thompson[5] bases an article on urinary calculus upon 3500 operations performed at the Canton Hospital since 1870. Of these, 2962 were vesical, 409 urethral, 116 preputial, and 5 renal. Only 2 per cent of the cases were females: 71 per cent were of the labouring class (50 per cent were farmers), 16 per cent merchants, 4 per cent students, and the remaining cases children under ten years, also many of the farming class. Ninety per cent of the patients were resident within a radius of sixty miles of Canton within or upon the borders of the delta. Thirty-two per cent came from the two districts nearest Canton. Very few were residents of Canton city. Twenty-five per cent were under ten years of age; the youngest was two and the oldest eighty-one. The heaviest stone weighed 14 oz.; the average weight was 7½ drachms. The chemical composition was as follows: uric acid and urates 78 per cent, phosphates 5 per cent, oxalates 4 per cent, oxalates and urates 1 per cent; there were 3 calculi of calcium carbonate, 2 of zanthin, and 2 of cystin. The urates were sodium, ammonia, and potassium; the phosphates chiefly of calcium, some triple; the oxalates usually of calcium, some of sodium. Of the cases with duration of symptoms of over ten years, 81 per cent had calculi of uric acid or of urates, 9 per cent of phosphates, 5 per cent of oxalates, 3 per cent of oxalates and urates. No change of residence, work, habit, or diet could be elicited to account for the chemical change from oxalates to urates or vice versa.

Thompson concludes that for the general surgeon with a comparatively small experience of stone work, cystotomy should be the operation of choice in most cases. The operation mortality in 350 unselected cases was 7·8 per cent. or excluding the earlier cases in which it was the operation of last resort and the cases in which there was pre-existing or concomitant drainage, it was 3 per cent. Perineal section was performed in 1990 cases, with a mortality of 7·9 per cent, or in the uncomplicated cases 3·8 per cent. The mortality in 384 cases of lithotrity and litholapaxy (330 cases of litholapaxy) was 9 per cent, uncomplicated cases 4·4 per cent.

Ulcer of the Bladder.—Hunner[6] finds that many patients suffering from simple ulcer of the bladder have at the same time, or subsequently develop, stricture of the ureter. In the last 8 cases of elusive ulcer operated on, 7 have had symptoms due to internal stricture. He finds a focal infection as the cause in most cases.

Kretschner[7] bases a paper on 5 cases of 'elusive ulcer' of the bladder. Other names that have been suggested for this condition are 'paracystitis', 'circumscribed panmural ulcerative cystitis'. The disease has mainly been described by Hunner, who has recorded 25 cases, but it was recognized and described by Nitze in 1907. The majority of cases occur in women. Frequent and painful micturition occurs in all cases, and persists during the day and night. The frequency amounts to fifteen minutes, and the pain is very severe. Blood is found in the urine in varying amounts. The *B. coli* or a mixed infection may be present, or the urine may occasionally be sterile. Cystoscopy is painful and the bladder capacity is limited. The ulcers vary from a pin-point to 2 cm. in diameter, and are surrounded by a zone of hyperæmia sharply circumscribed. Areas of œdema round the ulcer have been described. The diagnosis depends on the extreme distress on cystoscopy, and the discovery of areas of ulceration. Tuberculous ulceration must be excluded. Non-operative treatment does not give any improvement. Bladder irrigations aggravate the symptoms. The bladder should be opened suprapubically and the ulcer-bearing area excised.

Fowler[8] describes 3 cases of a similar nature. The urine may be quite clear and sterile. There is great sensitiveness in the urethra on introducing the cystoscope, even after careful application of local anæsthetics, and the bladder is hypersensitive and intolerant. Casual inspection of the bladder reveals nothing abnormal, but on further examination a small circumscribed area of inflammation is found on the anterior wall which on closer study shows a sharply defined, intensely congested, elevated area. The severity of the symptoms suggests tuberculosis, but the urine is microscopically clear and contains no tubercle bacilli. Chronic granular urethritis and trigonitis must be excluded. Remissions of the symptoms are more common in granular urethritis, while with ulcer the suffering is more constant.

Tuberculosis in the Bladder.—Casper[9] discusses this condition, and states that it occurs in two forms, general or local, and is usually secondary to tuberculosis of the kidney. After nephrectomy improvement may be expected only if the bladder muscle is not impaired by fibrous degeneration. When the wall is contracted no treatment is of use, and relief can only be given by narcotics and exclusion of the bladder. No improvement has been observed following the use of tuberculin. Guyon's dictum that the tuberculous bladder should be treated by **Instillation** rather than by irrigation holds good to-day. The author does not favour the use of carbolic acid as advocated by Rovsing, or the use of lactic acid, while silver nitrate is of use only for mixed infections. Subjective relief is afforded by instillations of **Oily Solutions**, with or without iodoform or gomenol. The best results are obtained by the instillations once or twice a week of 20 to 30 cm. of 1–20,000 solution of **Bichloride of Mercury.** This solution should be left in the bladder, and its strength should be increased gradually to 1–2000. Hollander's method is invaluable. He gives **Potassium Iodide** internally, and, a few hours later, instils **Calomel in Oil** into the bladder. Casper has modified this method, using in addition **Guaiacol**, which has a soothing effect in the tuberculous bladder. The instillation he recommends consists of 10 c.c. of a mixture of calomel 2, guaiacol 5, and sterile olive oil to make 100. This treatment should not be repeated more than once a week, and should be continued for a long time. Casper has used diathermy with success.

In 21 cases of tuberculosis of the bladder, 17 of which persisted after nephrectomy, Parisi[10] reports 10 cured and 9 much improved after treatment by diathermy. The interval since the nephrectomy varied from six months to six years. The proportion of cases is largest in the ulcerative form. The application was without direct contact with the tissues, with the exception of 2 cases when electro-coagulation was performed.

Vesico-intestinal Fistula.—Mackay[11] states that this is an uncommon condition, only 342 cases having been reported in the literature. The chief etiological factors are malignant growths and tuberculosis. [This is not borne out by the experience of other observers.—J. T. W.] In the collected cases the opening in the intestinal canal was found most frequently in the rectum, and next most frequently in the sigmoid. In the remaining cases it was discovered in the small intestine and cæcum. The fistulous tract may be direct or it may extend to a sinus. The symptoms are the passage of gas and fæces through the urethra and the passage of urine through the rectum. Treatment depends on the cause. When due to trauma, abscess, or disease of the appendix, operation is satisfactory. In some cases when the cause was tuberculosis or syphilis, spontaneous healing has occurred.

Sutton[12] discusses *vesico-sigmoidal fistula*, and reviews 34 cases in which operation has been performed at the Mayo Clinic. There was great preponderance of the type due to inflammation and infection, in contradistinction to the fistula due to malignant conditions, the ratio being 14·5 to 1; the ratio to those of traumatic origin was 9·6 to 1. The bladder mucosa may be normal in the presence of a vesico-sigmoidal fistula. Mild cystitis or local areas of cystitis around a fistulous opening are common. The symptoms from vesico-sigmoidal fistula existed in the majority of the 34 patients for a year or more prior to operation. Ascending uretero-pyelonephritis is not usually associated with vesico-sigmoidal fistula. When due to infection or inflammatory origin the fistula may heal spontaneously. Operation results show a cure of 67·6 per cent of the patients and improvement in 17·6 more. In 32·3 per cent of cases cured of vesical fistula a fæcal fistula remained, which healed in from fifteen days to three years and three months; only in 2 cases was there a recurrence of the symptoms, which were cured or improved at the second operation. The operation mortality was 11·7 per cent.

Rankin and Judd[13] report 2 cases of *vesico-appendical fistula.* A normally placed cæcum is not in close relation to the bladder, but in ptosis of the cæcum from various causes it may be in the pelvis, and if the appendix becomes inflamed it may become adherent to the bladder. Perforation follows and a vesico-appendical or vesico-cæcal fistula forms, either from rupture of the appendix or the formation of an abscess, or from a communication forming between the appendix and the bladder. The communication may be incomplete and not permit of the passage of fæcal particles or seeds. The histories of the cases are very similar. There is an attack of acute abdominal pain radiating into the pelvis, followed by passage of gas and food particles. Cloudy urine infected with the colon bacillus is present almost from the onset.

Leukoplakia of the Bladder.—Kretschmer[14] records a case and reviews the literature. The condition is rare, and only 43 cases were collected. It may occur at any age, but is usually found between thirty and fifty years. Males are more frequently affected than females (34 to 8). Venereal disease is not a factor in the etiology. The cause has been regarded as congenital or chronic inflammatory. The entire urinary tract may be the seat of the disease. The extent of bladder involvement varies. The whole mucosa is rarely affected. When limited, the area affected may occur anywhere in the bladder. In one case (Czerny) leukoplakia was found in a diverticulum. Calculi, stricture, pyonephrosis, and tubercle have been noted as associated with the disease. In one case (Leber) there was leukoplakia in the kidneys and in the eye. Various bacteria have been found in the urine, but it may be sterile. There is no combination of symptoms by which the condition can be recognized. Many of the patients passed large or small flocculi, or masses, for years. Large numbers of epithelial cells are passed in the urine. Renal colic may result from the passage of masses of membrane from the renal pelvis. On cystoscopy, there are white or grey, pale, lustreless, irregular-shaped plaques surrounded by normal or by inflamed mucous membrane.

The treatment consists in washing the bladder with **Silver Nitrate, Oxycyanide of Mercury,** or **Resorcin. Pelvic Lavage** has been used. Surgical treatment of associated conditions, such as stone, may be called for. Cystotomy and excision have been tried for the leukoplakia.

Treatment of the Bladder in Paraplegic Patients.—David[15] reviews the methods in use for this condition. In early cases without urinary infection the use of the catheter should be avoided, and the bladder distention should be relieved by manual expression of the urine. If this fails, a catheter should be passed. If urinary infection occurs, cystotomy should be performed.

[In the reviewer's opinion, based upon the observation of many hundreds of cases, where cystotomy is performed after infection from catheterization has occurred, it is too late to prevent ascending pyelonephritis, which is invariably fatal. Cystotomy should be performed before any catheter is passed, and suprapubic drainage continued until involuntary reflex micturition is established, when the bladder may be allowed to close. This occurs, as he first pointed out, at an average of fifty days after the injury.—J. T. W.]

Chronic Retention in Cases of Enlarged Prostate.—Zwalenburg[16] describes a method of emptying the bladder in this condition. A catheter was tied in the urethra and attached to a rubber tube 5 ft. long connected with an ordinary douche-can containing 1–4000 solution of **Mercuric Chloride.** By raising and lowering the douche the pressure could be regulated. At 12 in. above the base of the bladder there was a slow discharge of urine into the can. The can was left at this height for twelve hours and then lowered to 10 in., and emptied whenever it exceeded 2 in. of fluid. In forty-eight hours 6 in. height was reached, and during the next twelve hours the bladder emptied itself completely against this head and the urine became slightly blood-stained. The catheter was then allowed to drain into a bottle. Fear of clotting in the bladder influenced the discontinuance of the pressure. The patient was 'badly collapsed'.

Contracture of the Bladder Neck.—Day[17] refers to four methods of treatment: (1) Young's punch operation; (2) MacGowan's modification, with the bladder opened suprapubically or by an incision through the prostatic, membranous, or bulbous urethra; (3) Bugbee's high-frequency current method; (4) A method suggested by the author, in which the bar is held in the fenestrum of Young's punch, needled with a small electrode, and charred with the high-frequency current. After it is burnt it must be punched out before the punch can be removed. The high-frequency current prevents bleeding after the punch has been used.

Caulk[18] has devised an instrument similar to the Young punch, but the obturator has at its extremity an iridioplatinum cautery blade about ¼ in. wide instead of a knife-blade. To burn the tissue of the prostatic obstruction and prevent hæmorrhage the procedure is carried out slowly under low heat.

The burning is done best by a slow rotating movement. There is no irrigation attachment to the instrument, since dilatation of the orifice is unnecessary, and there is less danger of short-circuiting in a dry field. More complete anæsthesia is required than in the Young operation, and this is obtained by infiltrating the tissues of the orifice with novocain by means of a special syringe through the outer sheath.

Suprapubic Drainage.—Macalpine[19] has introduced a tube for suprapubic drainage the object of which is to prevent retraction of the bladder into the pelvis, which permits leakage alongside the ordinary tube and infection of the prevesical space, and also to avoid the pressure of the tube on the bladder base. The tube is a Pezzer catheter in which the end has been altered into a flange curved slightly backwards towards the tube. The size of the exit provided by this tube is sufficient to preclude any likelihood of a clot obstructing it. Vulcanized against the side of the larger tube is a smaller one which passes through the flange and projects as far as the bladder base. This forms the inlet tube for constant irrigation.

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BLADDER, GROWTHS OF.

Sir John Thomson Walker, F.R.C.S.

In a report[1] from the International Labour Office, Geneva, the result of an inquiry into *the relation of bladder growths and work in aniline factories* is discussed and the prophylactic measures are enumerated. Rehn in 1895 published 3 cases of growth of the bladder in workers in an aniline factory in Frankfort-on-Maine. Until 1912, little additional evidence had been collected. Lauenberger in that year published 18 cases in workers handling aniline dyes at Basle. From 1901 to 1910 the approximate number of male workers in Basle was 56,500, and the number employed in the aniline factories was 840. During that period 6 workers in aniline dyes died of growth of the bladder, and there were 12 deaths from a similar cause among the rest of the population. Six cases of tumour of the bladder were observed at the Surgical Clinic at Basle from 1861 to 1900 before the development of the chemical industry. From 1901 to 1910, after the establishment of the chemical industry, 16 cases of growth of the bladder were seen, 10 of which occurred in aniline workers and 2 in dyers. A large proportion of the growths have been malignant and occurred after the age of forty. Exposure for many years appears to be necessary. The products that are suspected to be deleterious are all amino compounds. Lauenberger enumerates the following : Safranin, dianisidine, dihydrothyoxiline, Congo red, and benzopurpurine ; benzidine and betanaphthylamine are considered particularly dangerous. Predisposition, lack of cleanliness, malnutrition, and alcoholism, all play a part. The poisonous products enter the body by various routes : aniline, which is volatile, by the respiratory organs, others by the alimentary canal and the skin and mucous membranes. Early diagnosis by means of the cystoscope is important. Kuchenbucker has elaborated a method of examining the urine to demonstrate the presence of amino compounds, and large quantities of these compounds are found in the urine of the workers. Precautions have been taken in these factories which are believed to have yielded good results : good ventilation, cleanliness of floors and walls, absorption of dust and vapour, well-closed apparatus, reduced working hours, attention to the wearing of gloves and clothes close-fitting at the neck and wrists, baths, careful selection of workers, periodic examination of urine, compulsory notification of hæmaturia, and routine cystoscopic examination in suspicious cases.

Beer[2] discusses the technique of the *operative treatment of neoplasms* of the urinary bladder. Electric cauterization should not be used in growths (1) that are not readily accessible ; (2) that surround the sphincter, and bleed, so that a thorough treatment is impossible ; (3) that are so numerous that the bladder is studded with tumours ; (4) where the bladder is intolerant. The treatment in these groups is the subject of the article. The author is careful to avoid implants, and the following technique is used : The bladder is irrigated and then emptied, and the patient placed in the moderate Trendelenburg position. The bladder is exposed extraperitoneally, the meatus clamped and cut, and the bladder raised by forceps on the bladder end. The peritoneum is stripped off, and the bladder delivered as far as possible from the abdomen. The prevesical space is carefully packed off with several layers of gauze, which protects also the incision in the parietes. The bladder is opened, and the papilloma immediately cauterized with the electric cautery hook or with the Paquelin cautery (hooked point). In cases of multiple growths each growth is separately burnt. Also extensive cauterization is preferable to a too superficial treatment. A large growth is grasped in curved clamps, and the cautery cuts between this and the bladder wall. If the bladder wall is infiltrated, a wide resection with the cautery is carried out. If a ureter is involved in the infiltrated area, it is left attached until this area is resected, and then cut away from the resected portion at a distance from the growth and implanted in a healthy part of the bladder. The incision in the bladder wall is carefully seared with the cautery, the table is lowered, and the whole wound filled for about five minutes with alcohol. The protective gauze packing is removed and the bladder sponged dry. The bladder wound is closed round a tube by infolding the charred edges with a layer of plain catgut sutures, and over this a layer of chromic gut is applied.

Thomas[3] states his view that the cystoscope is all important in determining the best form of treatment in bladder tumours. In exceptional cases the differential diagnosis will depend on the histological examination of an excised portion of tissue, or on the cystogram. Fulguration is the treatment best suited for single or multiple papilloma, and resection of the bladder is the radical treatment for favourably situated carcinoma. For malignant disease involving the neck of the bladder, total cystectomy may exceptionally be performed. In certain cases of carcinoma unfavourably situated for resection or too far advanced for radical treatment, cystotomy followed by intense fulguration, radium implantation, and x rays is on trial, with a promise to prolong life and, rarely, to effect a cure.

Judd and Sistrunk[4] discuss the *surgical treatment of malignant tumours* of the bladder. The greatest difficulty and danger is infection in the field of operation. Infection of the bladder, and frequently of the kidney also, is present in the majority of cases before operation. Free drainage of the operation field is difficult. Malignant tumours of the bladder are either papillary epitheliomata or carcinomata. Papillary tumours of the bladder are either benign or malignant, and in some instances it is difficult to distinguish the one from the other. If there is doubt and the tumour is small, fulguration should be tried as long as it is showing a good effect, but should be discontinued if there is no response in a reasonable time. Nearly all cases of cancer of the bladder have extensive growths involving the perivesical tissues before there is any sign of metastasis. Tumours situated at the dome of the bladder can be removed completely. The most inoperable tumour of the bladder is situated at the vesical neck.

From January, 1910, to January, 1919, 202 cases were submitted to operation. The hospital mortality was 12·9 per cent. In 1910, 12 patients were operated, and of these 3 are still living and have no evidence of recurrence. In one of these a complete cystectomy was performed and the ureters were brought out through the lumbar muscles. Tables are given showing the number of patients alive according to the time since the operation. Most of the recurrences come within the first few months after operation. If the patient can survive the first year his chances of remaining well are increased. The functional results in cases cured by operation are good, and in many cases micturition was normal.

Harris[5] reviews a series of 38 cases of *papilloma of the bladder* treated between January, 1914, and January, 1919.

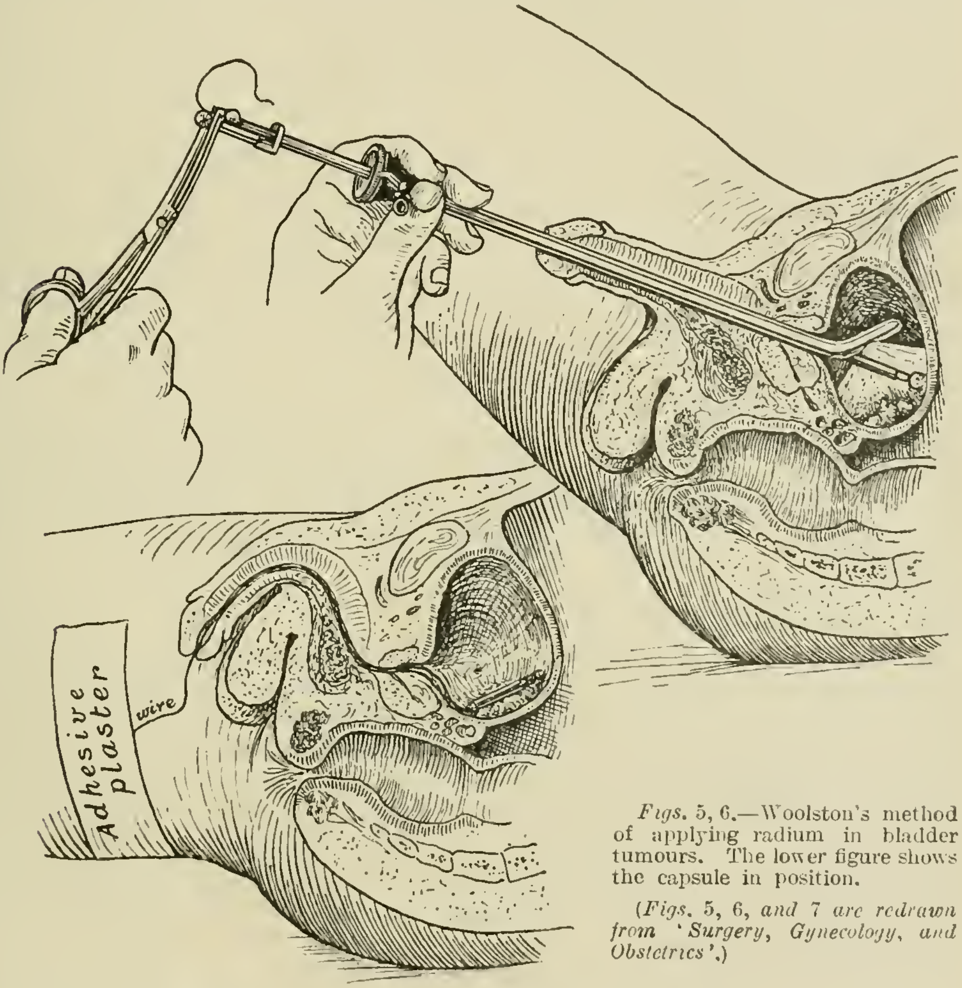
Of the 38 patients, 27 are alive and free from trouble at times varying from one and a half to six and a half years after the operation. Of the remaining cases, 6 were well up to six months after operation, and then disappeared. Of the remaining 5, 1 died in three days of cardiac dilatation, 1 died of influenza after four months without recurrence of bladder symptoms, and 3 could not be traced longer than three months. Of the 38 patients, 33 were treated by high-frequency, and 5 by suprapubic cystotomy with destruction of the tumour and bladder mucous membrane with the Paquelin cautery. Of these latter, 1 patient died; the remaining 4 were alive and free from recurrence at periods varying from one and a half to four and a half years.

Melen[6] recommends, for the *x*-ray *diagnosis of bladder growths,* that the bladder should be distended with air and the first radiogram taken, then filled with 25 per cent sodium bromide and a second radiogram taken, and that lastly a picture should be taken immediately after emptying the bladder. In a case which he records, the outline of a large malignant growth was shown in the third plate where it could not be demonstrated in the first two.

In dealing with *growths involving the lower end of the ureter,* Lower[7] removes the tumour with the mucous membrane and submucous tissue surrounding the ureter and leaves the part of the tube which penetrates the muscular wall. The after-result is good. [This is what happens in all resections of papilloma at the ureteric orifice when the surgeon removes the mucous membrane with the growth. It can hardly be regarded as a novel method. For malignant growths the extent of bladder wall removed is obviously too limited. —J. T. W.]

Temple Mursell[8] recommends fulguration of bladder papillomata of moderate size and not covering a large area. Large growths, and especially large sessile growths, are better dealt with by the open method. Severe cystitis is a contra-indication. The cases should be kept under observation and cystoscoped every six months. A great advantage of the method is that the patient is not kept from work, and where no cutting operation is necessary, patients may be encouraged to seek early relief instead of waiting until the growth has reached a large size.

Woolston[9] describes *an instrument for the application of radium to tumours of the bladder.* The radium is placed in a platinum capsule, the end of which has a clip with sharp points which grasp the wall of the bladder. The forceps used to attach the capsule to the bladder wall has a hollow shaft about 14 in. long with a hollow obturator. When drawn into the forceps, the closed end of the clip is compressed and its jaws are opened. By means of the obturator the capsule is expressed and the spring clip released, and the clip grasps the wall of the bladder as it closes. When the clip is attached and the instrument removed, a guide of silk or wire running from the capsule through the urethra is fastened to the thigh. To remove the capsule, the guide is threaded through the obturator of the applicator, the capsule is engaged in the end of the instrument, the clip is compressed, and the jaws are opened and detached from the bladder wall. The bladder should be kept distended with six ounces of sterile water during the application of the radium; otherwise its wall will fall on the capsule and a burn of the normal mucous membrane will develop. The instrument is used through a direct operating cystoscope, or through a Kelly's tube in the female. (*Figs* 5, 6, 7.)



Figs. 5, 6.—Woolston's method of applying radium in bladder tumours. The lower figure shows the capsule in position.

(*Figs.* 5, 6, *and* 7 *are redrawn from* '*Surgery, Gynecology, and Obstetrics*'.)

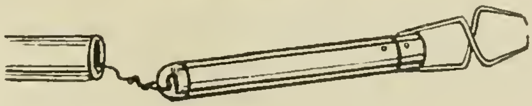


Fig. 7.—Radium container, natural size.

Geraghty[10] discusses *the value of radium in the treatment of bladder tumours.* Before 1910 the only method of treating bladder tumours was excision by operation. Recurrences were frequent, especially in cases of benign papilloma, as transplantation occurred at the time of the operation. In the records of the Hopkins Clinic up to 1910, Geraghty was able to find only one cure after the removal of a papilloma by operation. Since the introduction of fulguration only one case of papilloma has been operated on. Papillary carcinomata do not respond to fulguration, and may be made worse by it. All papillomata, benign or malignant, respond to vigorous treatment with radium. The more malignant the growth, the greater the amount of radiation that is necessary. When extensive infiltration has taken place, it is impossible to cause the complete disappearance of the tumour with radium. In the malignant type of papilloma, those that are resistant to fulguration are easily destroyed by fulguration after they have been radiated.

Geraghty's routine is to radiate all papillary tumours except those which are benign, in which fulguration effects a cure. Between 103 and 210 mgrm. of radium are used. The radium is applied with a specially-built cystoscope which is held in place by means of a mechanical arm attached to the table. The bladder should be moderately distended with water. Radiation is given for one hour, one to three times per week, depending on the size of the tumour and the reaction.

Geraghty concludes that, while benign and malignant papillomata and the early papillary carcinomata disappear under the influence of radium, the infiltratory types are very resistant to this agent. Therefore, where the infiltratory character of the growth has been determined, and the tumour is sufficiently localized to be removed completely, a radical resection is indicated. Following the removal, cystoscopy should be done early, as recurrence of the growth yields promptly to radium. The use of radium has not diminished the tendency of bladder tumours to recur, recurrences being observed in about 30 per cent of the cases treated. (*See also* RADIOTHERAPY.)

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BLOOD, BACTERIOLOGY OF.

O. C. Gruner, M.D.

Levy[1] gives importance to the phenomenon observable with the naked eye in broth cultures of the blood—namely, that the sediment is bright red as long as the culture is sterile, whereas the sediment becomes cyanotic, or violet, as soon as the culture becomes fertile. The reason is that the hæmoglobin remains oxyhæmoglobin in the first case, but turns to reduced hæmoglobin in the second. Sometimes a brown colour appears, owing to admixture with methæmoglobin. The organisms take up the hæmoglobin from the red corpuscles while the latter are still living. Levy points out that it is possible to know whether the blood culture is positive or not very much sooner than by the microscopic method.

Escomel[2] treats the venepuncture blood with acetic acid in order to dissolve the red cells; centrifuges, and examines the sediment fresh, or with the ultramicroscope, or stained by the customary methods. By this means the variations of the leucocytes can be studied daily in a given case, and the presence of organisms easily made out. He finds that micro-organisms are present in the blood very much more frequently than is usually believed.

REFERENCES.—[1]*Presse méd.* 1921, April 13, 296; [2]*Ibid.* 1920, Nov. 20, 835.

BLOOD, CHEMISTRY OF.

O. C. Gruner, M.D.

1. *Glucose.*—Ernst and Weiss[1] describe a method of estimation of glucose in the blood which makes the torsion balance unnecessary. A bent, pointed, glass tube, accurately marked to show 0·115 c.c., passes through a rubber cork into a small flask holding 15 c.c. (marked accordingly on its neck). A small exit tube is fused into the neck above this mark, and receives a rubber

connection for aspiration. Blood is drawn up to the mark in the tube, from the finger, and this amount is sucked back into the flask. Bang's salt solution is then aspirated through until the flask is three parts full. After careful shaking, the solution is added to reach the mark. The product is filtered through a small filter, and 13 c.c. of filtrate are used for the estimation.

Pickering[2] finds that the blood-sugar is almost invariably raised in diabetes, and tends to increase with the duration of the disease. The estimation is of great value in regard to prognosis, since the amount varies directly with the clinical severity. A high renal threshold does not appear to be a bad sign.

Paullin[3] finds that glycosuria may be of renal origin, the excretory cells being unduly permeable. In such a case the blood-sugar amounts to 70 to 110 mgrm. per 100 c.c.—the normal range.

Langfeldt[4] explains hyperglycæmia as arising in one of three ways: either there is a change of reaction in the liver, so that the liver-diastase can operate upon the glycogen; or there is a change in the curve of action of diastase, so that it will act even at the ordinary reaction of the tissue; or there is deficiency of pancreas hormone, which, he says, is essential to glycogen formation in the liver (Davis and Ellison[5] say that the diastases of the blood are solely derived from the pancreas).

The Leytons[6] speak of the high sugar value in the blood of cases of malignant disease. This has a bearing on the fact that the bacteria with filterable spores, which they have found in cancers and sarcomas, grow best in a medium containing sufficient glucose. Friedenwald and Grove[7] say that a high blood-sugar content means either diabetes, cancer, nephritis, tuberculosis, or thyroid disease, in order of probability.

2. *Aldehyde Substances.*—Substances showing the properties of aldehydes have been found in many diabetics and nephritics. Stepp[8] has studied these substances, and believes that they are chiefly represented by acetaldehyde. There is no fixed ratio between the amount of sugar in the blood and of these aldehydes.

3. *Lipoid Constituents.*—Clark and Evans[9] have made an extensive research into the problem of the relation between lecithin and cholesterin and the anti-hæmolytic property of blood-serum. A certain percentage of hæmolytic substances may exist in blood without damaging the red blood-cells. Patients suffering from anæmia show diminished resistance to these agents, and the loss of resistance is much greater in hæmolytic anæmias, e.g., Addison's anæmia. These workers questioned whether the hæmolytic agents were not always present in the blood, but were inhibited from acting by the lipoids named. Red cells treated with a solution of lecithin will resist the hæmolytic action of saponin markedly. They found that lecithin by itself would increase the hæmolytic power of sodium oleate, but lessen that of saponin. There was, however, no very definite relationship between either cholesterin or lecithin and protective power. Chauffard, Laroche, and Grigaut[9] bring evidence to show that the cholesterin content of the blood is controlled by the suprarenals.

4. *Bilirubin.*—This may be estimated by a diazo reaction, according to Van der Bergh.[10] One volume of serum is mixed with two volumes of 96 per cent alcohol, and the precipitated albumin removed by the centrifuge. The clear fluid is pipetted off, and ¼ volume of diazonium solution is added (25 c.c. of 0·1 per cent sulphanilic acid, 15 c.c. of strong hydrochloric acid, and 0·75 c.c. of aqueous ½ per cent sodium nitrite—freshly prepared). If bilirubin be present, a beautiful red colour appears, turning violet. Should turbidity appear, owing to fatty acids, a little heat will remove it, or the addition of 2 or 3 drops of ether. By using a standard solution, quantitative (colorimetric) observations can be made. Biliverdin will not give the reaction.

The rate of the reaction should be taken into consideration. The author believes it possible by this means to distinguish between cases of biliary retention and excessive hæmolysis, and failure of the hepatic cells themselves.

5. *Complex Substances.*—Mandelbaum[11] describes some new substances in the blood, to which he gives the name 'cytophilins'. These are lined up with the end-globulin, and have a special affinity for cells, whether of the same person or of other persons. When such cells are charged with cytophilins they destroy the complement of guinea-pig serum. The cytophilins are discharged by the presence of human serum. They are colloidal in nature, and their properties are destroyed by heating to 56° C. He believes they may be the precursors of amboceptors.

Bond[12] gives a careful study of auto-agglutinogen, a substance derived from red blood-corpuscles. There is a non-specific agglutinogen A, and several specific forms, B, C, D, etc. It is connected in some way with the stroma of the red cells, and becomes manifest as they degenerate. The red cells now agglutinate with their own serum, or with a foreign serum with which they do not react when freshly shed. Auto-agglutination is found in 65 per cent of positive Wassermanns; it was met with in 9 per cent of general cases of ill-health; it was met with in every case of acute lobar pneumonia, and in many cases of various septic infections. It is clear from this work that information of value is to be obtained by research in this direction.

Hadjopoulos,[13] in working out a problem connected purely with serology, has shown that hæmolysins are to be located in the lipin fraction of the protein molecule of the red cell.

It is evident from these and other papers that the time is nearly ripe for placing the various complex substances spoken of in immunity work into certain parts of certain cells, whether floating (blood-cells) or fixed (hæmopoietic tissues of all kinds). The complexity is one of nomenclature, inevitable until the real key to the facts is learnt, and for practitioner as well as specialist it is most necessary to possess a pictorial conception of the various phenomena of immunity—pictorial, that is, in regard to the actual histological forms, and not in the artificial form of the Ehrlich diagrams. Dale's[14] suggestion that agglutinability of red cells may be the visible effect of the loss of some substance from them will also help to simplify the conceptions in this field of study.

6. *Residual Nitrogen.*—Richter-Quittner and Hoenlinger[15] have devised a simple method for determining the residual nitrogen in the blood. It makes use of ultra-filtration. The Bechhold and Zsigmondy filters are employed. From 3 to 20 c.c. blood-plasma or serum are diluted ten to twenty times with distilled water, and aspirated by means of a water pump attached to the ultra-filtration apparatus. Proteins stay behind, and the residual nitrogen, including urea, comes through.

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BLOOD, COAGULATION TIME OF.

O. C. Gruner, M.D.

Larrabee[1] takes blood from a vein into a tube about one centimetre in diameter. When the tube can be inverted without spilling, coagulation is complete. The normal time is four to eight minutes. Love[2] also rejects the use of small punctures in favour of collecting the blood direct from a vein.

He draws the blood up a long capillary glass tube (drawn out from a lumen-diameter of 3·5 mm. to one of 0·3 to 0·5 mm.). The time when the blood first enters the capillary tube is noted, and in a few minutes about 2 cm. is broken off, the separated part being then snapped in half to observe if there is a fibrin thread in it. When this thread will stretch 7 to 10 mm. across the break, the end point is reached, and the time again noted. Love claims that this method is very exact. He lays much stress on noting the temperature of the room, and gives a table for making corrections accordingly. [Since practical experience shows that all one looks for is a coagulation time of over twelve minutes or not, such precaution seems an over-refinement.—O. C. G.]

Mason[3] gives a useful study of the process of coagulation. He shows that there are only three essential factors to study: the 'phospholipin complex', fibrinogen, and calcium. He seems to favour the old view that fibrin pre-exists in the circulation, merely separating out because the colloidal equilibrium is disturbed. He shows that stearin (glyceryl stearate) forms an insoluble calcium salt, but does not precipitate unless first treated with sodium hydrate; the sodium salt of stearin is soluble. In these respects stearin behaves like fibrinogen. Fibrinogen is in a 'protected' state under ordinary circumstances: that is, normally, the calcium cannot enter into union with the fibrinogen until, for instance, tissue-extract comes into play. The analysis of this paper and the references given in it lead us to the following graphic representation of the process of coagulation (*Fig.* 8).

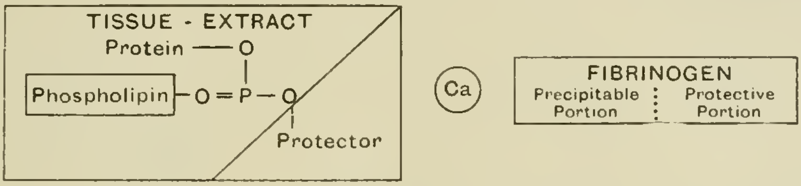


Fig. 8.

Before coagulation can occur, each 'molecule' needs to be split up so that both tissue-extract and fibrinogen are without their protective portions. Calcium is then able to link the two substances.

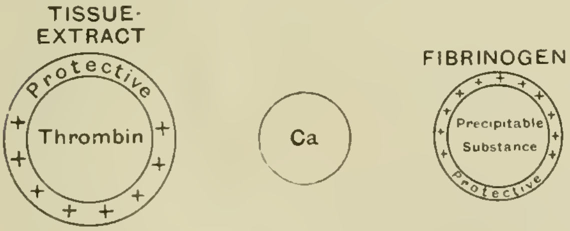


Fig. 9.

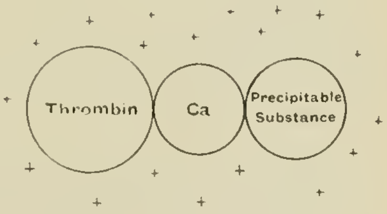


Fig. 10.—Clotted blood.

Represented more pictorially (*Fig* 9), we have the thrombin enveloped by a protective substance, which is electropositive (an electropositive colloid). The fibrinogen is built up similarly. The electrical sign is altered when the splitting up of each molecule occurs (through fibrin-ferment), union then taking place, the positive charge being now pictured as free in the medium. The three circles (*Fig.* 10) together represent the 'fibrin'.

It is difficult to place the components of the phenomenon into the histological elements, no less than to decide what exactly are the components. It is for this reason that the accompanying figures are tentative. As is clear from the papers referred to in a recent review,[4] the thrombin may be regarded as formed from a substance in the plasma (thrombogen) and one in the cells (thrombokinase), both tissue-cells and platelets being concerned. Bordet and Delange suggest that both these morphological components are necessary for the formation of thrombin, and their view is supported by Gratia's work on the subject. In this case, the representation of 'thrombin' should be marked 'tissue-extract platelet' in making the association between substance and morphological entity.

In every case of prolonged coagulation-time, these three factors require investigation. The chief diseases concerned are: (1) Aplastic anæmia, hæmorrhagic purpura, leukæmia, and pernicious anæmia—as associated with deficiency of platelets; (2) Hæmophilia—as associated with thrombopenia, platelets normal; (3) Chronic obstructive jaundice—where the calcium factor is at fault.

REFERENCES.—[1]*Boston Med. and Surg. Jour.* 1920, Aug. 5, 151; [2]*Med. Record,* 1920, Sept. 11, 436; [3]*Jour. of Labor. and Clin. Med.* 1921, 195; [4]*Med. Science,* 1921, 550.

BLOOD, CYTOLOGY OF.

O. C. Gruner, M.D.

Enumeration of Red Cells.—Dreyer[1] gives a method in which 0·1 c.c. of the blood is placed in 19·9 c.c. of 1·3 per cent solution of corrosive sublimate in saline solution. The mixture is shaken and 0·1 c.c. transferred to a small test-tube. To the same test-tube is added 0·1 c.c. of a standard solution of hen's blood, fixed with corrosive sublimate and known to contain 20,000 cells per c.mm. The mixed bloods are shaken thoroughly, and a drop is placed on a clean slide, covered, and examined with $\frac{1}{6}$th objective, using a square diaphragm in the ocular; 50 square fields are counted. The number of non-nucleated red cells, divided by the number of nucleated ones, multiplied by 4,000,000, gives the number of red cells per c.mm. An obvious adaptation can be made for enumerating the white cells.

Bürker[2] shows that as great accuracy of counting as possible should be attained, in order to answer problems in relation to the distribution of hæmoglobin in human blood and in animals. There is a certain ratio between the amount of hæmoglobin and the surface-area of the red cells. The amount of hæmoglobin per cell has to do with the rapidity with which the red cells sediment. Very careful observations have shown an extraordinary exactness of diurnal regulation of the numbers of red cells formed by an individual.

Sedimentation of Corpuscles.—Under normal circumstances, the rate at which corpuscles sink is constant for men. The rate is sometimes quicker in women, notably during pregnancy. The rate is increased in luetic nervous diseases, and in epilepsy and dementia præcox. György[3] found out that the variations are due to variations in lipoid-soluble substance in the blood, increase in this causing a slowing of sedimentation-rate. Linzenmeier[4] found that the removal of fibrinogen by narcotics, or by previously heating the plasma, delays sedimentation; addition of gelatin or gum arabic hastens it. He attributes this to alterations of the negative electric charge possessed by normal corpuscles. Abderhalden[5] finds that the substances which cause red cells to sink more rapidly in pregnancy are dialysable, and consequently have some relation to his pregnancy test. Pagniez[6] suggests that the phenomenon has some relation to liability to anaphylactic shock.

Resistance of Red Cells.—This subject has been carefully studied by Neilson and Wheelon,[7] using sapotoxin solutions for the reagent. The advantage of this reagent is that it reflects the degree of lipoid present in the red cells, since the more lecithin they contain the longer will it take to dissolve it. The technique is simple. Five small test-tubes are labelled, and kept in a water-bath at 25° C. The first tube receives 1 c.c. of 1–11,000 sapotoxin, the next receives 1 c.c. of 1–12,000 sapotoxin, the next a like amount of 1–13,000, and so on. An extra tube with 1–13,000 dilution is also used in order to note the time necessary for complete hæmolysis. Twenty c.mm. of blood are added from a finger-prick to each tube. In five minutes the tubes are centrifuged at high speed to stop the hæmolytic action, and the amount of hæmolysis is read off. The average normal reading is 1 : 13,937 ; the average time is 10·7 minutes.

These observers found that there is some substance in the serum which protects the red cells from hæmolysis. This sort of substance is increased in amount in pregnancy. The chief average values obtained may be tabulated as follows :—

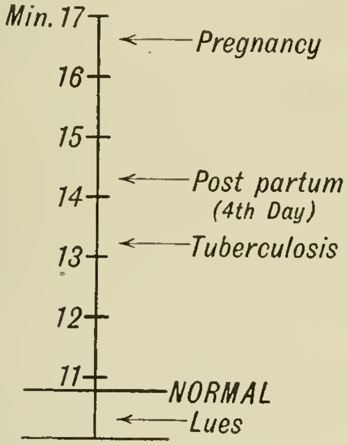


Fig. 11.—Time occupied in hæmolysis by a fixed strength (1–13,000) of sapotoxin.

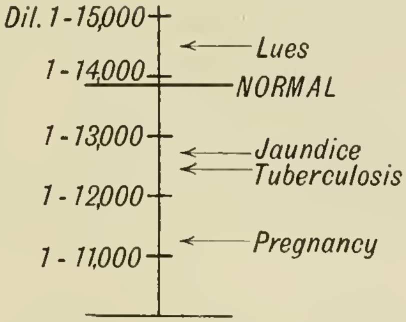


Fig. 12.—Hæmolysis in 5 minutes with varying strengths of sapotoxin.

That is, the resistance of the red cells to sapotoxin is increased in pregnancy, pulmonary tuberculosis, lead poisoning, obstructive jaundice, arteriosclerosis ; it is lessened in malaria, lues, hæmolytic jaundice.

The resistance test may be looked on as providing a picture of the state of cholesterin metabolism. No doubt it really shows the degree of balance between the stroma-structure and the cholesterin content of the plasma.

Size of Red Cells.—Price-Jones[8] has studied the size of red blood-cells at intervals during the day and night. It was found that the size increases gradually during the day, and diminishes during sleep. Increase of size goes with a more acid reaction of the blood, and shrinkage with a more alkaline reaction.

Reticulated Red Cells.—Attention is drawn to this subject by Cunningham,[9] who uses a ½ per cent aqueous or alcoholic solution of brilliant cresyl blue for the vital stain, and follows by Wright's blood stain. The proportion of reticulated red cells to the normal cells is noted. These cells being immature, the observation gives an insight into the proportions of young and old corpuscles. In hæmolytic jaundice these cells may reach as high as 62 per cent. Reticulation is an evidence of blood regeneration, and the percentage of these cells in the blood-stream is a reliable indication of the hæmatopoietic activity of the tissues.

Dark-ground Illumination.—The appearances presented by red cells with dark-ground illumination under various conditions are discussed by Dietrich,[10] in reference to Bechhold's views, also published this year. He concludes that the red cells are bladders made of a protein-lecithin-cholesterin complex, enclosing a fluid paraplasm made up chiefly of hæmoglobin. Hæmolytic substances thin out the envelope, and allow hæmoglobin to diffuse through.

Bechhold[11] describes the complex as in the form of a network of protein enveloping the red cell as the network encloses a balloon, the interstices being 'dressed' with a mixture of lecithin and cholesterin. The physical or chemical properties of each of the three components may be altered in different ways by different hæmolytic agents, so that hæmolysis acts sometimes through involvement of the protein, sometimes of the lecithin, and sometimes of the cholesterin.

The Normal Leucocytic Formula.—The opinion that the normal percentage of mononuclears in the blood is greater than formerly supposed was investigated by Zappa,[12] who places the proportions of mononuclears to polynuclears at 39 : 61, instead of 25 : 75 of older observers. Türk gave 26·9 : 73·1 in 1904, 41·9 : 58·1 in 1912. V. Bonsdorff had stated in 1914 that the ratio was 52 : 48, referring to the blood before breakfast.

Pathological Conditions.—Audain[13] offers certain simple interpretations of the white-cell count, in regard to the infections. Where the infection is in a tissue poor in lymphoid cells, the blood-cell formula will be a polynucleosis ; whereas, even if the same organism be at work, yet if the infection is in a tissue rich in lymphocytes, the mononuclears will dominate. In this way, for instance, the blood-picture of a *coli* infection of the bladder will differ from one in the intestine. In the former case the protective cells are mobilized from a distance ; in the second case, there is local production. Hence it may be concluded that a case in which polynucleosis occurred throughout the illness would be one of inflammation in cellular tissue, or in the lungs or pleura, or bladder. If the neutrophilia gives place to a lymphocytosis, the infection may be supposed to have arisen in lymphatic structures (e.g., wall of intestine). By means of simple relations of this kind, the degree of resistance can be estimated, and medicamental measures adopted in order to raise it. The total white-cell count—above 5000—measures the degree of defence.

Escomel[14] approaches the subject in a different way, using a method in which the red cells are hæmolysed, and only white cells collected. These are spread on slides and stained. In this way a latent blood-infection can be readily detected. He finds definite changes even in those who readily become septic after operations.

Eosinophilia.—Klinkert[15] insists that eosinophilia is related to the state of the autonomic nervous system. Its occurrence in gout and epilepsy, asthma and hay fever, is referred to. Fresh thyroid extract helps epileptics, and may act by stimulating the autonomic nervous system. He compares the eosinophilia of convalescence to the local eosinophilia which accompanies the secretion of the digestive ferments through the mucosa of the stomach and intestine. This secretion is under the control of the vagus. The fact that eosinophilia appears after the crisis of an infectious disease and during convalescence, along with an increased output of uric acid and a slowing of the pulse, indicates to him that the autonomic nervous system is concerned.

Qualitative Cytology.—Arneth's well-known work on the neutrophil leucocytes in all manner of diseases finds its culmination in a recently published work in two volumes.[16] A number of drawings of the cells found in different types of disease are provided in which it is possible to see at once what is the essential feature of a given case in regard to the minute quality of the leucocytes. The Arneth count is here extended logically to all leucocytes, and the author insists that the careful study of the blood-cells in this way is repaid, not merely in the perception of immunity reactions, but also in the practical diagnosis of incipient disease. The qualitative cytology (that is, the minute nuclear and protoplasmic structure of the blood-cells) notifies the existence of disorder even before the clinical signs betray it. The work is essentially directed towards proving the truth of Arneth's convictions. To those willing to accept the fundamental principles and start from that point, it becomes clear that in this method of study we can watch the final cellular reactions proceeding within the body during illnesses, especially the acute fevers, where there is the preliminary paralysis of reaction followed by the outpouring of leucocytes in enormous numbers, and lastly the destruction of the superfluous leucocytes, whereby an almost explosive liberation of protective substances is ensured. It is clear that clinical hæmatology is not truly begun until investigations on these lines are customary in every teaching centre, and, as Arneth shows, are supplemented by similar studies in the cells of pus, exudates, transudates, and excretions and secretions. He adheres to his former view that the cells with divided nucleus are older than those with less divided nucleus, and shows why such a view must be true. The objections to his system on the ground of the time involved are met by the fact that every minute detail rightly assessed possesses practical value.

REFERENCES.—[1]*Lancet,* 1921, i, 219; [2]*Münch. med. Woch.* 1921, i, 571; [3]*Biochem. Zeits.* 1921, cxv, 71; [4]*Arch. f. d. g. Physiol.* 1920, clxxxi, 169; [5]*Fermentforschung,* 1921, iv, 230; [6]*Presse méd.* 1921, May 21, 405; [7]*Jour. of Labor. and Clin. Med.* 1921, May, 454, and June, 487; [8]*Jour. Pathol. and Bacteriol.* 1920, xxiii, 371; [9]*Arch. of Internal Med.* 1920, Oct. 405; [10]*Münch. med. Woch.* 1921, i, 457; [11]*Ibid.* 127; [12]*Pathologica,* 1920, xii, 296; [13]*Presse méd.* 1920, ii, 796; [14]*Ibid.* 835; [15]*Zeits. f. klin. Med.* 1920, lxxxix, 1; [16]*Die qualitative Blutlehre,* 1920.

BLOOD PLATELETS.

O. C. Gruner, M.D.

Buckman and Hallisey[1] have devised a method for counting platelets, using the blood from a vein. The blood runs into a miniature transfusion tube evenly paraffined. A sample is drawn into a red-count pipette in three minutes; this gives the red-cell count. Again in five minutes; this gives the white-cell count. Again in twenty minutes; this gives the platelet count. The diluting fluid is: 6 grm. glucose, 0·4 grm. sodium citrate, in 100 c.c. distilled water; filter; add 0·02 grm. toluene red ('neutral red'), and when this is dissolved add 0·1 grm. crystal violet; heat to 60° C. for five minutes; after special centrifugalization and re-filtration, 0·2 c.c. formaldehyde solution is added.

Van Herwerden[2] gives a simpler method. One drop of blood suffices. The diluting fluid is 21 parts of a 10 per cent solution of urea in water, plus 9 parts of normal saline. Draw up in a white-cell pipette to mark 0·6. Wipe off the first drop of blood. Run 0·2 divisions out of the pipette on to the site of puncture. Allow the blood to flow into the fluid, and draw up both to mark 1. Fill up to 11 with the diluting fluid. Shake gently for five minutes. Allow the mixture to stand in the counting chamber for thirty minutes, and then count as usual. The normal is between 350,000 and 221,000.

Schenk[3] has devised an instrument for diluting the blood without using a pipette. It consists of a bulb of 6 c.c. capacity, with a wide opening at one end and a small tap at the other. A glass bead lies in the bulb. An accurate stopper fills the wide end, and the stopper is traversed by a fine glass tube with graduations upon it. The bulb is filled with the diluting fluid, so that when the stopper is replaced it reaches the zero mark. The stopper is removed and a drop of blood allowed to flow in. The stopper is carefully replaced. The different position of the fluid in the stem enables one to measure the size of the drop, and therefore know the dilution. After careful mixing, the tap is opened enough to withdraw a drop from the bulb on to the counting chamber.

REFERENCES.—[1]*Jour. Amer. Med. Assoc.* 1921, Feb. 12, 427; [2]*Ibid.* March 12, 723; [3]*Münch. med. Woch.* 1921, April 8, 427.

BONE CAVITIES, SEPTIC. (*See also* ORTHOPÆDIC SURGERY.)

Sir W. I. de C. Wheeler, F.R.C.S.I.

Kanavel[1] says that with old osteomyelitic cavities it is a *sine qua non* that they should be obliterated, either by removal of the walls and overhanging bone so that the surrounding soft parts can come in contact with the bone throughout, or by a pedicled transplant of muscle, fat, or skin laid into the depth of the cavity in such a way as to produce obliteration. These cases are usually not difficult, since they ordinarily involve the shaft of the bone. One patient, however, presented a particularly interesting problem because of the presence of a cavity in the lower end of the femur, involving practically the entire head of the bone down to the articular surface (*Fig.* 13). If an attempt had been made to remove the walls, the joint would certainly have been destroyed. The method employed to fill the cavity by a flap of soft tissues is shown in *Fig.* 14.

REFERENCE.—[1]*Surg. Gynecol. and Obst.* 1921, May, 453.

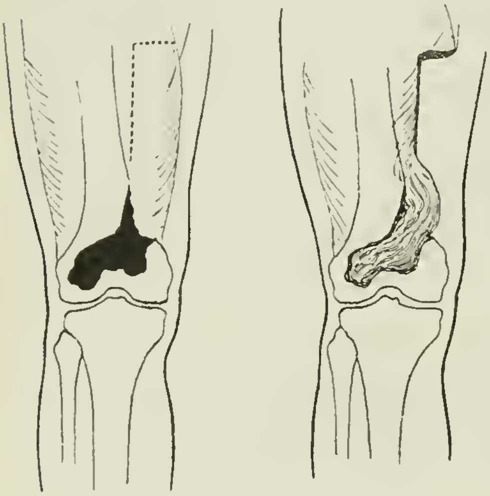


Fig. 13. *Fig* 14.

Figs. 13, 14.—Showing obliteration of cavity filling entire lower end of femur.

(*Redrawn from 'Surgery, Gynecology, and Obstetrics.'*)

BORAX POISONING. (*See* POISONING.)

BRAIN, SURGERY OF. (*See* NEUROLOGICAL SURGERY.)

BRAIN TUMOURS. (*See* CEREBRAL TUMOURS.)

BREAST, CANCER OF.

Sir W. I. de C. Wheeler, F.R.C.S.I.

The urgent necessity of early diagnosis of cancer of the breast and the further necessity of early and radical surgical treatment, combined with radium and x-ray therapy, are becoming widely appreciated by the profession. The old text-book signs of malignancy must no longer be depended upon. When the skin is wrinkled, the nipple retracted, and the glands enlarged, the case may be looked upon as well advanced. Early carcinomatous change will be found in many cases of cystic breasts, without any clinical signs of malignancy. Radical operation should be performed when there is any doubt whatever as to the nature or condition, and reliance must not be placed on the naked-eye appearance of the specimen. Sampson Handley[1] traces the lines of advance in breast cancer, and rightly gives credit to Sir Harold Stiles as a pioneer in this field of surgery. He says the operation must conform to the following conditions :—

1. The primary growth, from which centrifugal spread begins, must always be the centre of the operation area. Thus an operation for a growth of the inner endge of the breast is not the same as an operation for a growth of the outer edge.

2. A circular, area of skin 4 or 5 in. in diameter and centred upon the primary growth, requires removal.

3. A circular area of deep fascia 10 or 12 inches in diameter and centred upon the primary growth, must be ablated. It is first exposed by raising thin flaps of skin and subcutaneous fat, then surrounded by a ring incision, then

elevated all round its edge from the deep parts until the line is reached where muscle also must be removed. The removal of a maximal area of deep fascia is demanded by the presence in this layer of the growing edge of the disease.

4. The removal of deep fascia is often too limited in the epigastric region. He has shown that this region is specially dangerous because here only a layer of fibrous tissue separates the fascial plexus from the subperitoneal fat. It is here that by direct infiltration growth often reaches the peritoneal cavity. In all cases, except perhaps with a growth of the upper edge of the breast, an area of the anterior layer of the sheath of the rectus abdominis requires removal.

It is important, according to this authority, to deal with the subclavian glands which lie at the apex of the axilla, below the clavicle, between the subclavian muscle and the upper edge of the pectoralis minor, to the near side of the axillary vein. The surgeon who slurs over this part of the operation incurs a heavy responsibility. Radiation by **X Rays** is insisted upon as a post-operative treatment; by these means outlying cancer cells can be killed. Prognosis in cases of breast cancer still remains bad, and the only hope of improving results is by earlier operation. Efforts should be made to educate the public as to the importance of the early removal of painless tumours of the breast.

Quick,[2] in discussing the **Radium** and **X-Ray Treatment** in cancer of the breast, comes to the following conclusions:—

1. The *x* ray occupies a place in the treatment of every case of carcinoma of the breast.
2. In certain cases radium may be used to considerable advantage in combination with the *x* ray.
3. The cases in which radium proves valuable in this combination are mainly: (*a*) Localized flat recurrences where surface applications of radium can be made directly over the lesion; (*b*) Bulky recurrences where radium emanation can be embedded directly into the tumour; (*c*) Axillary involvement, which is always difficult to influence favourably with *x* rays alone, where radium emanation can be embedded in the neoplasm or in axillary fat tissue so as to give a diffuse radiation of the axillary space from within; (*d*) Inoperable primary cases where embedded emanation can be utilized to radiate the tumour from within, as well as the axilla, and even supraclavicular space in the same way, if necessary; (*e*) Primary cases refusing operation where treatment may be carried out much in the same way as in the inoperable primary cases.
4. The combination of radium and *x* rays may, in some instances, change an inoperable into an operable case.

Finally, he points out certain theoretical considerations which, he says, strongly encourage us to pursue the study of the treatment of mammary cancer by radium and *x* rays. When one embeds radium emanation needles in a primary tumour and in invaded lymph nodes, and follows with massive *x*-ray dosage through the skin, a powerful destructive effect is produced on the tumour tissue, amounting to local necrosis; the lymphatics may reasonably be considered sealed, invisible vagrant cells are incarcerated or destroyed, and all this is accomplished without removing the natural barriers which exist against progressive carcinoma. In fact both types of radiation tend to increase the exudation of lymphocytes and plasma cells and the growth of connective tissue around the tumour, and these are the only natural agents of resistance to carcinoma that we know anything about. The treatment of mammary cancer by these physical agents is, therefore, based on sound theory, since it intensifies the natural reaction of the tissues to carcinoma, while producing in addition a very strong destructive action on the tumour cells.

REFERENCES.—[1]*Brit. Med. Jour.* 1921, i, 27; [2]*Surg. Gynecol. and Obst.* 1921, Feb., 156.

BRONCHIECTASIS. (*See also* NASAL ACCESSORY SINUSES.)

Arthur Latham, M.D., F.R.C.P.

Lynah and Stewart,[1] in an interesting investigation of röntgenographic studies of bronchiectasis and lung abscess after direct injection of bismuth mixture through the bronchoscope, make the following deductions :—

1. Bismuth mixtures can be injected into the bronchi and lungs of a living patient without danger.

2. The injection of an opaque substance into the lung of the living patient will open an enormous field of usefulness in the study of cough, the expulsion of substances from the lung, and lung drainage. It will also aid in localizing bronchial strictures in the same manner as in the œsophagus. Furthermore, it will be of the greatest aid to the thoracic surgeon by mapping out the abscess cavity in the respective lobe of the lung.

3. A definite lung abscess cavity is seldom seen bronchoscopically. Pus is usually seen coming from a branch bronchus, although the abscess may be well around the corner, and not in that portion of the lung from which the pus is oozing. An injection of bismuth or some other opaque mixture will 'clear up' this error.

4. Bismuth, when it enters the abscess cavity, is recognized by its metallic lustre, whereas when it is in the lobular lung structure it is discerned as a dull opaque area. Pus diffuses and soaks the lobular structure in a manner similar to bismuth ; this often makes the involved area appear many times larger than it really is.

5. The bismuth mixture injected in these patients was 8 c.c. of bismuth subcarbonate in pure olive oil (1–2). The mixture is sterilized by boiling.

6. The injection should be made slowly and not with a 'squirt', or else the röntgenographic observations may be spoiled by bismuth soaking the lung structure surrounding the diseased area.

7. It seems from these preliminary studies that cough and action of cilia are not the only means of expelling secretions.

8. While bismuth mixtures were originally injected for the purpose of lung mapping in cases of lung abscess cavities, they seem to have been of therapeutic benefit to the five patients upon whom they were tried. So far the procedure has done no harm.

9. While the fluoroscopic examination is important, stereoröntgenographic examination is the best means of localizing the cavitations.

10. Experience has shown that the *x*-ray examination should be made almost immediately after the removal of the bronchoscope, otherwise the patient, in a fit of coughing, will remove much of the bismuth from the involved lung.

REFERENCE.—[1]*Ann. of Surg.* 1921, March, 362.

BRONCHOSCOPY. (*See* ENDOSCOPY, PERORAL.)

BURNS. (*See also* SKIN DISEASES, GENERAL THERAPEUTICS.)

Sir W. I. de C. Wheeler, F.R.C.S.I.

Those who are familiar with the methods for the prevention of deformity following injuries to bones and joints will appreciate the necessity of the *prevention of deformity after extensive burns.* Sir Robert Jones has for a long time insisted on this treatment of anticipation in orthopædic surgery. Thus, all injuries about the hip are fixed in abduction, since neglected cases invariably suffer from adduction deformity. In injuries about the shoulder, the arm is fixed in abduction with the elbow tilted slightly forward ; if stiffness follows, the patient, by the gliding of the scapula, has almost a full range of movement. In injuries which might possibly involve stiffness of the wrist, dorsiflexion is practised from the onset, as it is well known that if these injuries are left to themselves a flexion contracture occurs. These principles of treatment should be applied after extensive burns, and the subject is dealt with by Harrigan and Boorstein.[1] They write as follows :—

In burns of the front or side of the neck, a collar of felt is applied to maintain the head in the middle line with the chin directed upward. If there exists a tendency toward contraction of one side, the neck is pushed to the other. The collar is made of felt about three-quarters of an inch in thickness. The height of the collar corresponds, generally, to the length of the neck from the chin to the sternum. This collar is surrounded with soft felt or muslin (*Fig.* 15), though one may use softer material. The collar is sewed following each dressing, although clips may be provided. We have found that sewing is an extremely simple procedure. As a rule, the nurses, after applying a dressing of paraffin, etc., place oilskin over the wound and then apply the collar instead of a bandage. The collar may be made of leather, plaster, or celluloid, but since these take time to prepare, felt appears more desirable. Indeed, an ordinary stiff linen collar, with gauze beneath, may be utilized in an emergency.

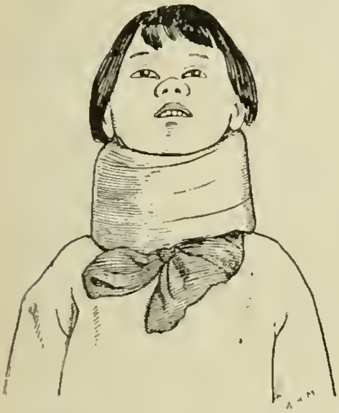


Fig. 15.—Showing proper application of a felt collar in cases of burns of neck.

(*Redrawn from the 'Annals of Surgery'.*)

In burns of the shoulder and axillæ, which are, admittedly, extremely common and which induce severe contractions, the arm must be kept in full abduction, in order to prevent its being drawn toward the body to produce the so-called 'bat-wing' deformity. In these instances, we tie the hand in slight abduction to the head of the bed, which is elevated, so that the weight of the trunk tends to drag the patient downward, while the upper extremity remains in marked abduction. In order to avoid constriction of the peripheral circulation, felt may be placed surrounding the wrist before applying the bandage.

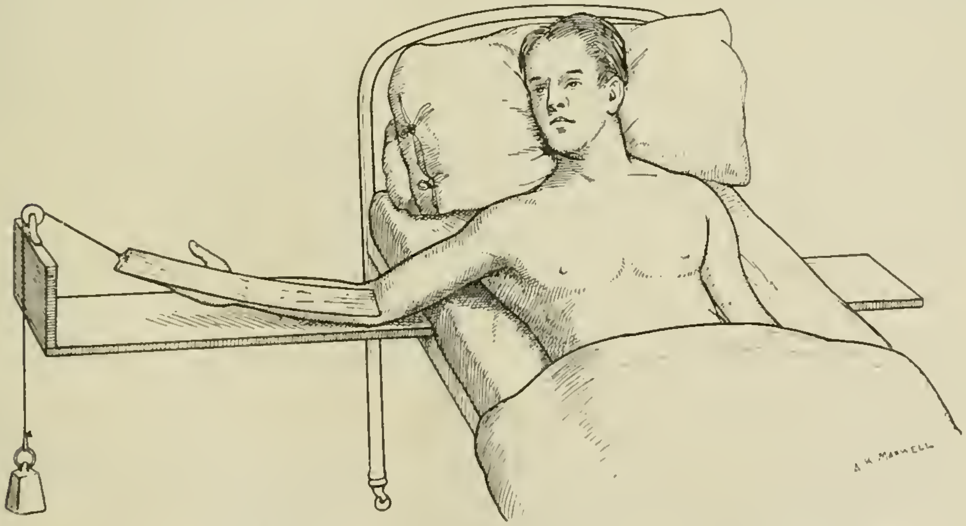


Fig. 16.—Showing Wheeler's method for abduction and extension of the arm by a weight and pulley fixed on a board underneath the mattress. A couple of pillows should support the arm.

In a case of a burn of the elbow, extension is maintained. [The writer finds that this extension can be provided simply in the manner shown in *Fig.* 16.—W. I. de C. W.] In burns of the wrist and fingers, the latter should be kept spread in order to avoid adhesions. For burns in the region of the hip, the feet should be tied in abduction to the foot of the bed. The same also applies in cases of burns of the knee. The various splints recommended by Robert Jones are useful. In conclusion, they state: (1) Contractures of burns can easily be prevented by early orthopædic treatment; (2) By using simple methods, such as tying the limbs in positions to prevent contractures, no deformities develop, and early recovery is obtained; (3) Holding the limbs in proper position accelerates the healing of the wounds; (4) Early massage, exercises, and the wearing of braces aid in obtaining satisfactory positions and proper use of the limbs.

Leigh[2] discusses the *surgical treatment of burns.* He states that there are limitations and some dangers in the use of paraffin-wax film or ambrine treatment. As regards choice of dressing, he quotes Stewart, who says: An ideal dressing for severe burns should be (1) aseptic, or (2) mildly antiseptic; (3) It should provide free drainage; (4) It should not macerate the tissues nor (5) stick to them; and (6) It must not necessitate frequent changing. Still another essential might be added, namely, (7) It should minimize the abnormal radiation of body heat from surfaces denuded of the protection of the skin and subcutaneous tissues.

It is suggested that for the purposes of treatment burns should be classified as: (1) Non-infected; (2) Contaminated; (3) Infected.

1. The non-infected group includes burns of the first degree and those of the second degree in which the blisters are unbroken. In this type of burn primary closure and the prevention of secondary infection are clearly indicated. The air-tight occlusive dressing provided by the paraffin film may be regarded as a primary closure of the wound.

2. Burns which can be treated within the first three hours after injury, and in which it is possible to remove entirely the dead or devitalized tissues by mechanical means, are classified as contaminated. The broken blisters and possibly small areas of superficial localized necrosis form the limit of dead tissue which can be thus removed. It is justifiable to attempt the primary closure of this class of burns with the paraffin film, provided the microscopical examination of the exudate does not show the presence of streptococci; but with the first sign of infection, general or local, the occlusive dressing should be removed and the burn treated as an infected wound.

3. Burns of the third and fourth degrees are classified as infected, and no occlusive dressings are ever applied until all the devitalized tissues are removed and surgical sterility of the wound surface has been obtained.

4. It is suggested that the cleansing of these wounds can be brought about by a daily immersion for a period of about one hour in a normal 1 per cent solution of **Sodium Bicarbonate** at body temperature, and then exposure of the burnt area to the air for the rest of the time. When large areas are involved, undue radiation of body heat must be guarded against by covering the patient with a blanket tent, under which a constant temperature of about 92° is maintained by means of electric light. The application of a single layer of paraffined wide-mesh gauze will permit of adequate drainage from the wound; this dressing will float off at the time of immersion.

Skin-grafting will of course be necessary in a number of cases of burns of third degree.

Leigh sums up as follows:—

1. As burns differ widely in degree, character of tissue destruction, bacterial content, and progress of healing, no one procedure as a local measure—wet or dry dressings, wax, or ointment—or no one solution, will prove equally valuable for all cases and all stages.

2. The same factors, infection and necrotic tissues, are present in burns as in all traumatic wounds, and therefore the same principles apply to their treatment as have been found of such practical value in the treatment of traumatic wounds.

3. The covering of burns with impervious dressings such as wax films is to a certain extent comparable with the surgical closure of traumatic wounds, and should be governed by the type of infection, the bacterial content, and the presence of necrotic tissue.

4. The débridement of burns by surgical excision, though theoretically ideal, is usually a mechanical impossibility. Dakin's solution, when it can be borne by the patient, removes the necrotic tissues of burns in the same satisfactory manner as in traumatic wounds, but, unfortunately, only a small proportion of patients will endure the pain which is caused by its application to such hypersensitive surfaces.

In the majority of our cases we have had to be content with natural tissue autolysis assisted by the mechanical cleansing of a daily immersion in normal salt or 1 per cent sodium bicarbonate solutions.

5. Until the condition of surgical sterility is obtained, we have found a dressing consisting of a single layer of wide-meshed paraffined gauze and the exposure of the part to the air provides the necessary drainage, and a dressing that will float off the wound with a minimum of trauma at the time of the daily immersion.

6. It is usually necessary to employ chemical antiseptics to obtain and maintain surgical sterility of burned surfaces if they are exposed to the air. The chlorine group have been the most satisfactory in our experience; however, unusual care must be taken in their preparation, and they should be tested to avoid the application of irritating chlorine or hydrochloric acid when using dichloramine.

7. The covering of these surgically sterile wounds with wax films will often maintain their sterility and thus provide the best conditions for the growth of the new skin.

8. The rate of growth of new skin and of grafted skin is at the maximum upon surfaces which have reached the condition of surgical sterility in the shortest interval of time.

9. The amount of scar tissue formed, and the consequent contractures, are in direct relation to the severity and duration of the infection.

REFERENCES.—[1]*Ann. of Surg.* 1920, Nov., 616; [2]*Therap. Gazette*, 1920, Oct. 15, 685.

CALCULUS. (*See* BLADDER; KIDNEY; URETER.)

CANCER. (*See also* BREAST; MOUTH AND FACE; RECTUM; SKIN; ETC.)

Sir W. I. de C. Wheeler, F.R.C.S.I.

The observations of Mayo,[1] that abdominal cancer appears only in an acid medium, and that alkalinity retards cancer growth, is of great interest. It suggests that there may after all be some substance in the contention of the late Dr. Forbes Ross, that cancer as a growth could be controlled by large internal doses of potassium. Mayo suggests that perhaps cancer of the stomach may commence in the acid medium by the irritation of hot drinks. The hot fluid passes along the lesser curvature, the common site of cancer, as does other food, and the stomach is of course insensitive to the heat. He found that in certain countries, where men took their food hot and women took it cold, the latter appeared to be immune from gastric cancer. It would appear, however, that many conditions are essential to the development of cancer; heredity does not extend beyond a certain inherited cell weakness;

and Mayo points out that any one theory cannot account for the change in the cell that causes it to adopt a lawless existence. **Radium**, as a treatment, gives the best results in growths with active circulation, as it has a marked influence on the wall of the blood-vessel. It probably acts on the cell nucleus, and checks division. **X rays**, on the other hand, act on the cell protoplasm, checking growth. *X* rays may destroy the controlling granules of the cell which contain its nucleus and chytoplasm, and this cell will become malignant if surrounded by the proper biochemic fluids. Thus cancer can not only be produced but controlled.

Jordan[2] gives an attractive account of the idea that cancer, to a large extent, is secondary to the toxæmia of intestinal stasis, and gives an uncompromising support to the ideas of Sir Arbuthnot Lane on this subject. He sums up the treatment as follows :—

"I have endeavoured to point out in this paper the dangers of neglected stasis and its far-reaching consequences, and shall conclude by outlining the means that should be taken to prevent the occurrence of cancer." They may be classified as follows :—

1. Avoid stasis in general, with its attendant toxæmia ; in other words, keep all the tissues healthy.

2. Avoid sources of local irritation in the alimentary tract. (*a*) In the lips and mouth and tongue—avoid rough pipe-stems, jagged teeth ; abolish pyorrhœa. (*b*) In the pharynx and larynx—eliminate chronic catarrh. (*c*) In the œsophagus—swallow no large boluses of food ; eat slowly ; masticate thoroughly. (*d*) In the œsophagus and stomach—avoid excess of strong irritant spices (for example, mustard, pepper) and avoid extremes of heat and cold, especially in drinks. (*e*) In the stomach and duodenum—prevent duodenal distention, pyloric spasm, and duodenal and pyloric congestion, by abolishing the ileal stasis which causes them. (*f*) In the small intestine—prevent bacterial decomposition of the contents of the jejunum and ileum due to ileal stasis, by the means shortly to be described. (*g*) In the large intestine—prevent stagnation and decomposition of solid fæces in any part ; combat catarrh by local and general means.

It is never too early in life to commence these measures. In infancy, even on the first day of life, see to proper feeding. If artificial feeding is necessary, the milk should be given at regular intervals in measured amounts at the correct temperature ; avoid overfilling the infant's stomach. Constipation in the infant is best combated by small doses of liquid paraffin.

In childhood, provision should be made for warm clothing, good regular meals, with vitamins in the diet, an active day with a midday rest, and a long restful night. During school and college years the same conditions should be continued, with a regulated open-air life, avoiding extremes of exhausting effort, and insisting on an early hour for retiring and a minimum of eight hours in bed.

In patients who have not had the advantage of suitable conditions from infancy—that is, in whom stasis in a more or less severe degree is already present—the exact method to adopt must depend on the precise anatomical and pathological conditions which exist. If mechanical faults are present—for example, obstruction due to bands or to cicatrices—these must be dealt with by surgical means. If the large intestine is already grievously damaged so that it is no longer capable of repair, nothing short of its removal will avail.

In less extreme cases much good may be done by careful attention to the details of hygienic living already described. In addition, mechanical means should be taken of supporting unduly dependent portions of the bowel, and liquid paraffin given to ensure two or three soft evacuations daily, vaccines to overcome the toxæmia due to bacterial action in the large and small intestine, while medicines are useful to aid digestion, combat catarrh, and lessen spasm at the sphincters.

Cancer of the uterus and ovaries follows upon chronic inflammatory conditions of these organs. As already explained, stasis plays a very important rôle in bringing about these conditions of chronic inflammation. It is clear, therefore, that much can be done to prevent the occurrence of cancer in the pelvic organs by means which prevent or relieve chronic intestinal stasis.

The author concludes : "To the genius of Sir Arbuthnot Lane we owe our understanding of the far-reaching effects of chronic intestinal stasis. Although we have not yet found the full solution of the cancer problem, may we not justly believe that we are at the dawn of a new era in the prevention of this dread disease ?"

A medical review of the cancer problem is given in *Medical Science*.[3] It states that the problem of inheritance, like the problem of possible increase of cancer, has not been solved. Recent advances in a surgical direction have not been of a fundamental kind. The injection of Coley's fluid has never received general sanction as a means of treating malignant disease. Coley has recently combined the administration of mixed toxins with radium and *x*-ray treatment. Probably the methods of this surgeon have never been sufficiently tried ; and it must always be remembered that an attack of erysipelas, in cases of malignant disease, was associated with cure by many of the older surgeons. The review concludes with the following paragraph on propaganda : It is obvious that improved results in cancer cases can be brought about by increased knowledge on the part of the medical practitioner. But he, in his turn, depends upon the patient. Careful examination of hospital records shows that, in spite of increased general knowledge, improved and cheaper means of transit, anæsthetics, and antiseptics, patients come to hospital for the first time with growths as large and as inoperable as they did fifty years ago. It therefore becomes a question whether public instruction on the subject of cancer is not desirable. The New York State Department of Health publishes a monthly bulletin called *Health News*, of which the February, 1920, number is devoted to cancer. The pamphlet has been drawn up with very great care, but is popularly written, and the underlying object is to instruct the public sufficiently that they shall seek medical help as early in the disease as possible. Similar propaganda have been employed in Germany and France for some years and have been suggested in Great Britain. Clearly it would be necessary for provision of a sufficiency of hospital beds to run parallel with the propaganda. Otherwise the present evil of a long waiting list for admission might only be intensified.

With our present knowledge, the best that can be done for cancer is to provide an early diagnosis, and to educate the public to the necessity of early and extensive operation, combined with radiation methods.

Lapthorn Smith[1] thinks we must come to the conclusion that cancer enters the system in most cases through the mouth. The list of frequency in organs is taken from Hoffman's book :—

Cancer of the stomach ..	40	per cent.
Female generative organs ..	30	,,
Liver	9	,,
Intestine	6	,,
Œsophagus	5	,,
Larynx	1½	,,
Tongue	1	,,
Thyroid, lungs, and other parts	7½	,,

Why are 40 per cent of the total deaths due to cancer of the stomach ? His explanation is that as cancer is most often taken into the system with food and drink, it naturally attacks the first suitable ground, that is, a place where there is cicatricial tissue. Ulcer of the stomach is a common disease ; when it heals it is by cicatricial tissue. Ulcer of the stomach is a disease of young people, cancer a disease of the middle-aged. The cicatrix gets older and harder every year, and its vitality grows less. If a person over 45 years of age, who has a cicatrix, eats some raw food which has been washed in water contaminated with cancer, as happened in one definite case, all the conditions for the development of cancer will be present. Cancer of the liver would naturally accompany cancer of the stomach owing to their close relationship physiologically and anatomically. These account for 49 per cent, almost a half.

Is cancer a parasitic disease ? To this question Professor Hartman replied that, while the pathologists claim that they have never seen a parasite, there are experiments which go to show that it is a parasitic disease. But, he said, because the parasite has not been found, is that any reason for saying that it does not exist ? For centuries we have known that syphilis was a contagious disease, yet it is only a few years ago that the parasite has been discovered. The same applies to tuberculosis, of which the parasite was undiscovered for centuries. Perhaps, he says, the parasite will be discovered to-morrow, and then we shall be astonished that we did not always recognize it.

Ochsner[5] discusses cancer infection. He thinks that because we cannot find the agent of infection we should not assume that it does not exist. He urges the importance of taking every precaution against cancer infection, although the infectiousness has not been proved. The Japanese, who are scrupulously clean regarding their skin, are very free from external cancer ; the reverse is true of the people of India. It has been proved by Professor Smith that cancer in plants is due to a micro-organism which can be isolated and cultivated, and which produced cancer when inoculated upon healthy plants. In the human cancer further study is progressing, and in the meantime healthy persons should not be exposed to cancer infection.

REFERENCES.—[1]*Mayo Clinics*, 1918 ; [2]*Brit. Med. Jour.* 1920, ii, 959 ; [3]*Med. Science*, 1920, Nov., 103 ; [4]*Practitioner*, 1921, March, 189 ; [5]*Ann. of Surg.* 1921, March, 294.

CANCER, CLINICAL PATHOLOGY OF.

O. C. Gruner, M.D.

Loeper and his co-workers[1] describe a paradoxical hyperalbuminosis in the blood of cancer patients. The normal content of blood albumins seldom exceeds 7·5 per cent, but cancer subjects show an increase to 11 per cent, in spite of cachexia and malnutrition. They find the degree of increase to depend on the size of the tumour, and that this is because the protein (which is a globulin) comes from the tumour itself. To counteract this excess of protein, the blood provides an increase of an erepsin-like ferment, which causes the total nitrogen in the serum to reach very high figures.

The Abderhalden reaction for cancer and other conditions has been very adversely spoken of by several writers.[2] Wells[3] discredits it because of discordant results ; others because of the difficult technique, which is always adduced as the source of failures to obtain consistent results. Gronberg[4] obtained successful results, but only at the cost of great labour.

Alexander[5] has studied the blood-groups of carcinoma cases, and finds that the majority belong to *Groups I* and *III*. In these cases the tumours were generally more malignant.

Pesci[6] has found that 30 per cent of carcinoma cases give a positive Wassermann ; the reaction ceases after repeated doses of radium treatment.

The study of the blood-cells in cases of cancer of the breast before and after operation, made by Ellen D. Anderson,[7] showed only a low or normal leucocyte count. The highest figure for 30 cases was 14,400. The number fell after operation in favourable cases, rose in unfavourable ones. On the whole, the figures given show that the operations made very little difference to the state of the blood. However, the report does not include studies on the detailed cytology of the various cells. The Arneth count is stated to show very little change in this series of cases.

Teilhaber[8] believes it advisable to take periodic leucocyte counts after excision of cancers, in order to know when to take measures to have the number of white cells increased. Venesection and diathermy have this effect. Organ-extracts, given subcutaneously, also raise the leucocyte count. The perivascular lymphocytes are regarded as a detoxicating filter, which must be maintained at all costs in subjects of carcinoma.

References.—[1]*Presse méd.* 1921, xxix, 333; [2]*Jour. Amer. Med. Assoc.* 1920, ii. 1786; [3]*Chemical Pathology*, 4th ed. 1920, 205, W. B. Saunders Co.; [4]*Finska Läk-sällsk.* 1920, lxii, 599; [5]*Brit. Jour. Exper. Pathol.* 1921, ii, 66; [6]*Radiol. med.* 1920, vii, 196; [7]*Glasgow Med. Jour.* 1921, May, 321; [8]*Wien. klin. Woch.* 1920, Dec. 2, 1091.

CARBON MONOXIDE POISONING. (*See* Poisoning.)

CARBUNCLE. (*See also* Skin Diseases, General Therapeutics.)

E. Graham Little, M.D., F.R.C.P.

Sidney Phillips[1] has had a long and painful personal experience of carbuncle, and is able to speak with unusual particularity of the symptoms and treatment. Pain may precede all other symptoms, and is usually deep and throbbing. In a few hours the skin gets hot and red, with a reddish-blue areola round the site. A tense, painful, prominent, bright-red oval swelling forms, with surrounding vivid œdematous and brawny tissue, pus shows beneath the skin and ulcerates through it, and the whole process takes from one to three months to run its course to recovery.

There are distinguishable two types of carbuncles: (1) The commoner and more superficial one, which develops mainly in numerous separate foci of necrosis, is very vascular, soon comes to the surface, perforating it by several openings, and has much pus and soft sloughs easily discharged in shreds or fragments. (2) A more deep-seated type with a single tough dense slough having much less vascularity and pus formation; the opening through the skin is formed and enlarged very slowly, and the slough is eliminated with difficulty, being tough and remaining whole instead of softening and breaking up.

Carbuncles with the same clinical aspect may occur on the face and lip, and are almost always rapidly fatal, especially in this latter position; facial carbuncles are best treated by scraping away the diseased tissues, applying carbolic acid, and ligaturing the facial vein.

Neither size nor prominence nor multiplicity will serve to differentiate boils from carbuncles, but when an affection localized to the hair follicle or sweat gland occurs it is a boil; if there are several such lesions aggregated together a superficial carbuncle results; if the lesion extends deeper, it is a carbuncle.

With the exception of the malignant facial carbuncle, the prognosis is good.

Treatment.—Pain is best relieved by hot **Fomentations** or **Poultices**, the latter being more comfortable; they must be changed frequently and must not be too hot. When discharge begins, fomentations are preferable. Before the skin is broken, antiseptic dressings are best avoided. The author found **Flavine** the most satisfactory of such applications. To get rid of slough and pus when the carbuncle has broken, syringing with the same solution as has been used to dress the lesion is recommended. Manipulation of the skin is deprecated, and too much washing of the surface is mischievous. Ointments and greasy applications generally make things worse; plugs of gauze soaked in a solution of **Glycerin. Acid. Carbol.**, diluted six times, should be inserted into the openings. **Sulphur** in the form of a drachm a day of the flowers of sulphur is the most useful internal drug. Intramuscular injection of **Collosol Manganese** succeeded best with the author, and he recommends **Opium,** especially in the diabetic cases, to relieve pain. Vaccines he found ineffective. As regards diet, the patient may eat as usual, except diabetic cases.

The author deprecates the resort to **Excision** unless there are special indications, such as are summarized below:—

1. Where the sloughing process is very deep-seated, perhaps under the fascia, and the inflammatory effusion is much obstructed in extending towards the surface; in these cases suppuration may extend widely and laterally, running between tracts of fascia and in the direction of least resistance. Pain is very intense, pyrexia may be marked, and serious constitutional symptoms arise. In such cases incision is imperative to give exit to the imprisoned pus.

2. Certain carbuncles, though not large, may be deep-seated and the slough may be very tough and thick; the process is subacute, the surrounding inflammation is not intense, and the amount of pus may be small. The opening formed in the skin may be single and very small at first, enlarging only very gradually; this, and the toughness of the slough and its depth, often imprison the small amount of pus there is beneath the slough. Eventually the opening in the skin becomes ulcerated away sufficiently for the slough to be got rid of, but it is a long process; toxins are absorbed, and in these cases he thinks incision should be performed.

3. Incisions to enlarge spontaneously formed openings in the skin or throwing them together are often useful as assisting discharge of slough and in accelerating healing.

4. Operation is sometimes required when final healing is prevented by tough bundles or bands of fibrous tissue which have resisted the sloughing process.

5. If either of the first two conditions has led to opening a carbuncle by operation, it is well to apply pure carbolic acid at the same time, but it is not desirable to incise a carbuncle otherwise progressing favourably in order to use carbolic acid.

REFERENCE.—[1]*Lancet*, 1921, i, 61.

CATARACT.

Lt.-Col. A. E. J. Lister, I.M.S.

Black Cataract.—Rollet and Bussy,[1] in an interesting article, conclude that the dark tint is due to oxidized tyrosin in the interior of the lens. They state that the prognosis is more serious in operations for black cataract: the majority of the complications, however, are probably due to too small an incision. The nucleus in black cataract occupies the whole of the lens. To avoid trouble, therefore, if a black cataract is diagnosed or suspected, a large incision should be made.

Cataract in Industrial Workers.—B. Cridland[2] states that the type of cataract usually known as 'glass-workers' cataract' occurs in iron-smelters. He suggests they should be entitled to compensation as the glass-workers are.

Healy[3] calls attention to the frequency of cataract among tinplate-workers. He thinks it possible for an ophthalmologist to differentiate it, in the early stages of the disease, from other types. He suggests the use of special goggles to prevent the heat entering the eye.

B. H. St. C. Roberts[4] has seen twenty-five cases of cataract in chainmakers, of a type closely resembling 'glass-workers' cataract.

MEDICAL TREATMENT.—Scalinci[5] says that in cataract developing in people with a special diathesis or dyscrasia, an **Iodide Solution** is of great value. The eye is bathed with an iodide solution, and an **Iodide Collyrium** is also used. The solution should not be stronger than 0·25 to 0·5 per cent at first. He prefers a one per cent solution of sodium iodide or rubidium iodide, with the addition of a trace of calcium phosphate. The best results are obtained in incipient cataract. The diathesis or dyscrasia must be simultaneously treated. He quotes Dor as saying, that of every ten patients with incipient cataract, eight can have the condition arrested, one can be cured, and only the tenth receives no benefit. Others are less enthusiastic, but Scalinci is of the opinion that this treatment is well worth a trial.

Franklin and Cordes[6] treated 31 cases of cataract with **Radium**. They think radium has a selective action on the lens and that it does not damage the normal structures of the eye. The vision was improved in 84·3 per cent. They consider that radium is of proved value in incipient cataract, and that their results confirm those of Levin and Cohen[7] as to the value of radium treatment in cataract.

OPERATIVE TREATMENT.—In *glaucomatous patients*, Morax[8] says the more mature cataract should be extracted as soon as useful vision is lost. In a case in which the tension had been lowered by sclero-iridectomy, after two unsuccessful attempts, though the incision in the cataract operation was placed outside the filtering scar, it ceased to function, and, in spite of another sclero-iridectomy, vision was lost. In a case in which the tension had been controlled by iridectomy, a successful result was obtained.

Temporary Paralysis of the Lids during Cataract Operations.—Villard,[9] in order to eliminate all risk of 'squeezing' in nervous patients and thus prevent loss of vitreous, makes a **Subcutaneous Injection** of novocain 1–100 and cocaine 1–150 over the fibres of the facial nerve as they spread out to supply the orbicularis muscle. Three injections are made: the first vertical, a little above and behind the eyebrow, deeply into the malar region ; the second from where the point of the needle has penetrated horizontally towards the upper part of the ala of the nose, 1 cm. below the infra-orbital region. The third injection is made at the external commissure and is directed outwards towards the parotid. About 2 cc. of fluid are used for the purpose. After two to five minutes, the lids can be separated without the smallest resistance on the patient's part, and when the effect has reached its maximum, the eye cannot be closed by voluntary effort. The duration of the paralysis is from ten to fifteen minutes. In order to avert any toxic action, a strong cup of coffee is taken before the injections are commenced. Villard states that perfect calmness is produced, doing away with the necessity for an assistant.

R. E. Wright,[10] following Villard's technique, except that he uses 2 per cent of novocain, has operated on a hundred cases of cataract. In only one of these was it unsuccessful. He has formed a very favourable opinion of the method. He stresses the importance of keeping the injection away from the lids.

Venesection as a Preventive of Intra-ocular Hæmorrhage.—E. E. Maddox[11] had a patient who suffered from malaria, gout, and myxœdema. She had lost one eye from intra-ocular hæmorrhage occurring after a cataract operation. Before operating on the other eye he treated her with quinine, laxatives, and thyroid. To reduce the risk of hæmorrhage he opened a vein in the right temple and pricked the episcleral veins before operating. The cataract was extracted in the capsule with a successful result.

Phakoerisis.—Barraquer,[12] of Barcelona, has operated on 1000 cases of cataract, by a method to which he has given the name phakoerisis. An incision nearly equal to half the circumference of the cornea is made. A special instrument, the erisophake, is now employed. It is practically a small spoon, with blunt edges, on a hollow handle, which is connected with an instrument producing a vacuum. This instrument is introduced into the wound, passed through the pupil which has been previously slightly dilated by a mydriatic, and placed on the lower half of the lens. He then turns on the vacuum, which causes the spoon to adhere firmly to the lens and, by a movement of the handle, rotates the lens round the horizontal axis, so that the upper edge passes through the pupil. This movement ruptures the fibres of the zonula. The lens can then be withdrawn held on to the erisophake. (*Plates I to VI.*)

Though Barraquer thinks the simple operation is the operation of election, only 219 of his 1000 operations were simple, the others being performed with iridectomy, chiefly of the peripheral variety. The following visual results were obtained. Between 0·7 and 1·0, 69·4 per cent ; 0·3 and 0·7, 24 per cent ; 0·0 and 0·3, 6·3 per cent ; no vision, 0·3 per cent.

[We are indebted to Dr. Barraquer for kindly lending us the original negatives, from which our illustrations, which show the chief stages of the operation, are taken.—A. E. J. L.]

R. O'Connor,[13] in a paper entitled *The Safest Method of Cataract Extraction*, condemns the Smith Indian operation, judging apparently chiefly by the results of Green and Fisher, which he compares with his own. He has not done the operation personally. He prefers **Capsulotomy** with a conjunctival flap and peripheral iridectomy.

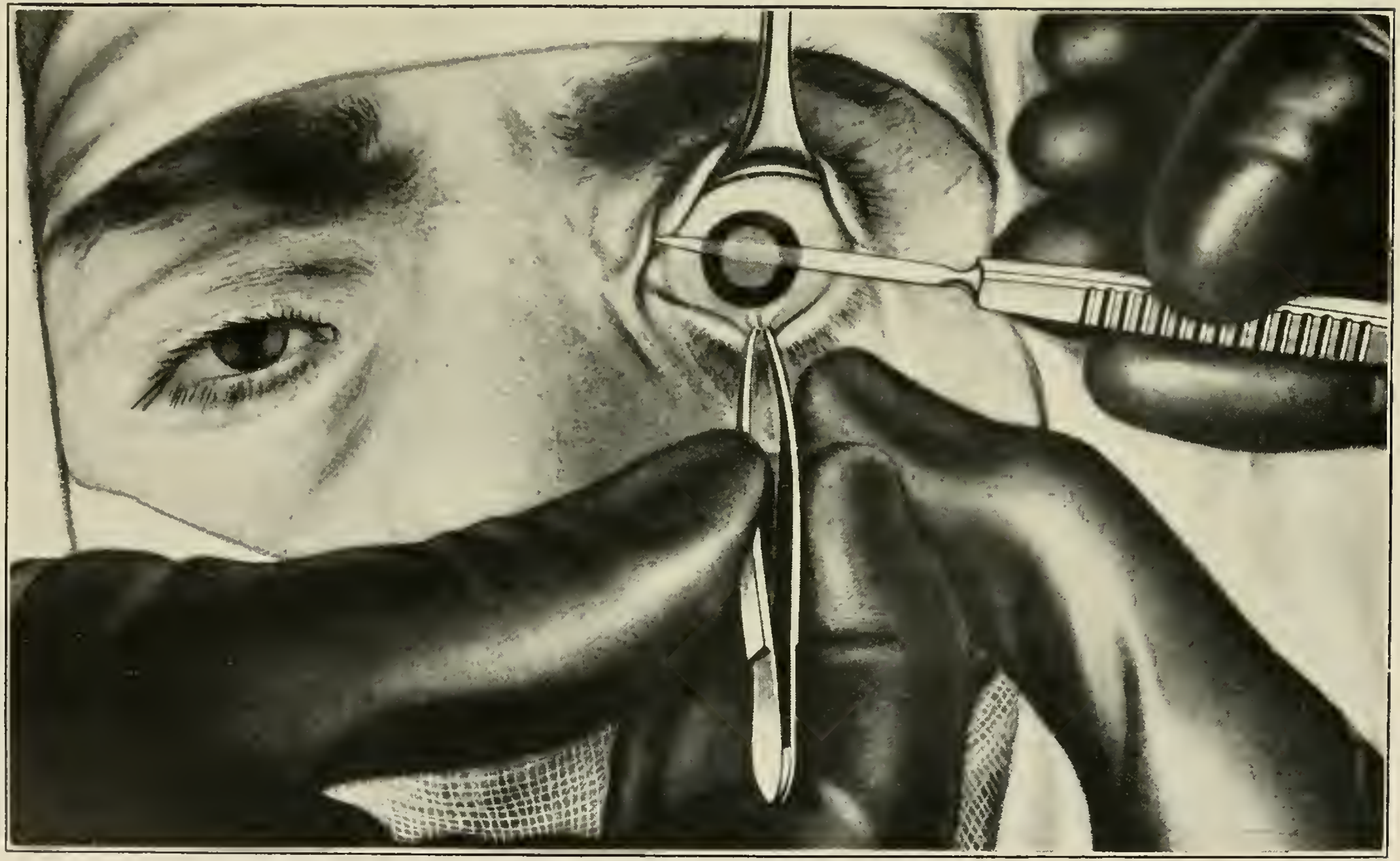
[In our opinion, having had special opportunities of trying most of the methods of operating on cataract and of seeing the work of others, it is impossible for any writer to lay down for others what is the safest method of cataract extraction. The safety of an operation must be judged by the vision obtained and retained by the patient, not by the result on the operating table, or on leaving hospital. The fact seems to be that most of the better-known methods of operating have their special advantages, and also disadvantages. Some methods also are more difficult, and require greater skill and experience for their performance, than others. Generally speaking, a less perfectly conceived operation, perfectly performed, will yield a higher percentage of good results than a more perfectly conceived operation which is imperfectly done.

Intracapsular extraction, by whatever method performed, removes the lens intact in its capsule, leaving no dead lens matter or capsule to be a possible source of irritation and danger, and avoids also the possibility of after-cataract. The advantage of this is obvious. Intracapsular extraction is, however, a difficult operation to learn, and has its special dangers and drawbacks as well as its special advantages. This argument, however, applies to other operations in surgery. Cataracts, eyes, and patients, as well as the circumstances under which one is called on to operate, often vary enormously. We believe therefore that the highest average of good results will usually be obtained by the surgeon who does not confine himself to any one procedure, but who selects the operation most suitable for each particular case, taking into consideration his own operative skill and experience, and the circumstances under which he has to operate.

We may be pardoned for mentioning here a few practical points which long and bitter experience has burned into our memory. In cataract operations we are usually dealing with a fully conscious patient. Any slight failure of technique may convert a perfectly quiet patient into a troublesome one. The

PLATE I.

BARRAQUER'S CATARACT OPERATION

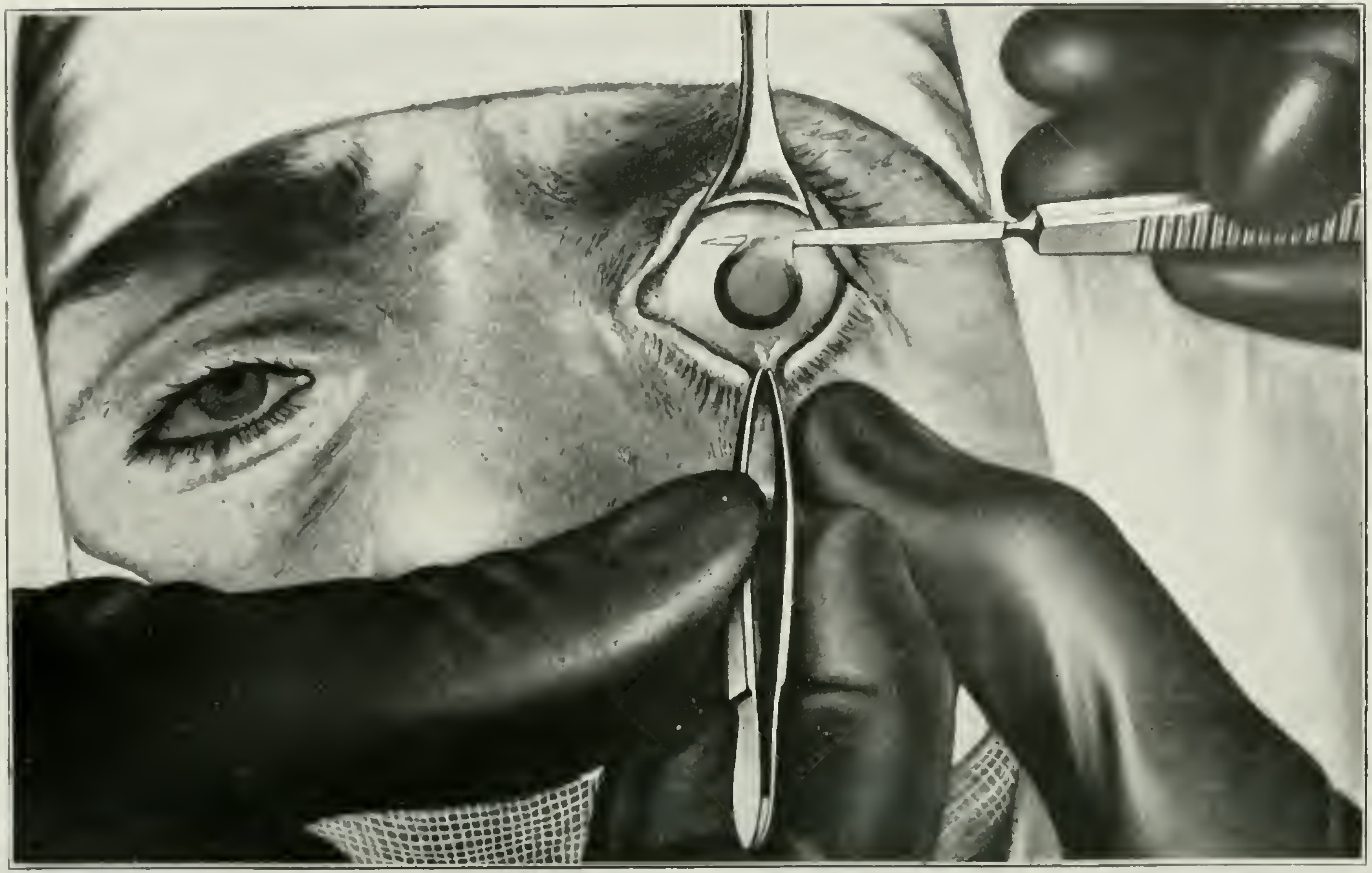


The incision—1st stage.

Plates I-VI are from negatives kindly lent by Professor Barraquer, Barcelona

PLATE II.

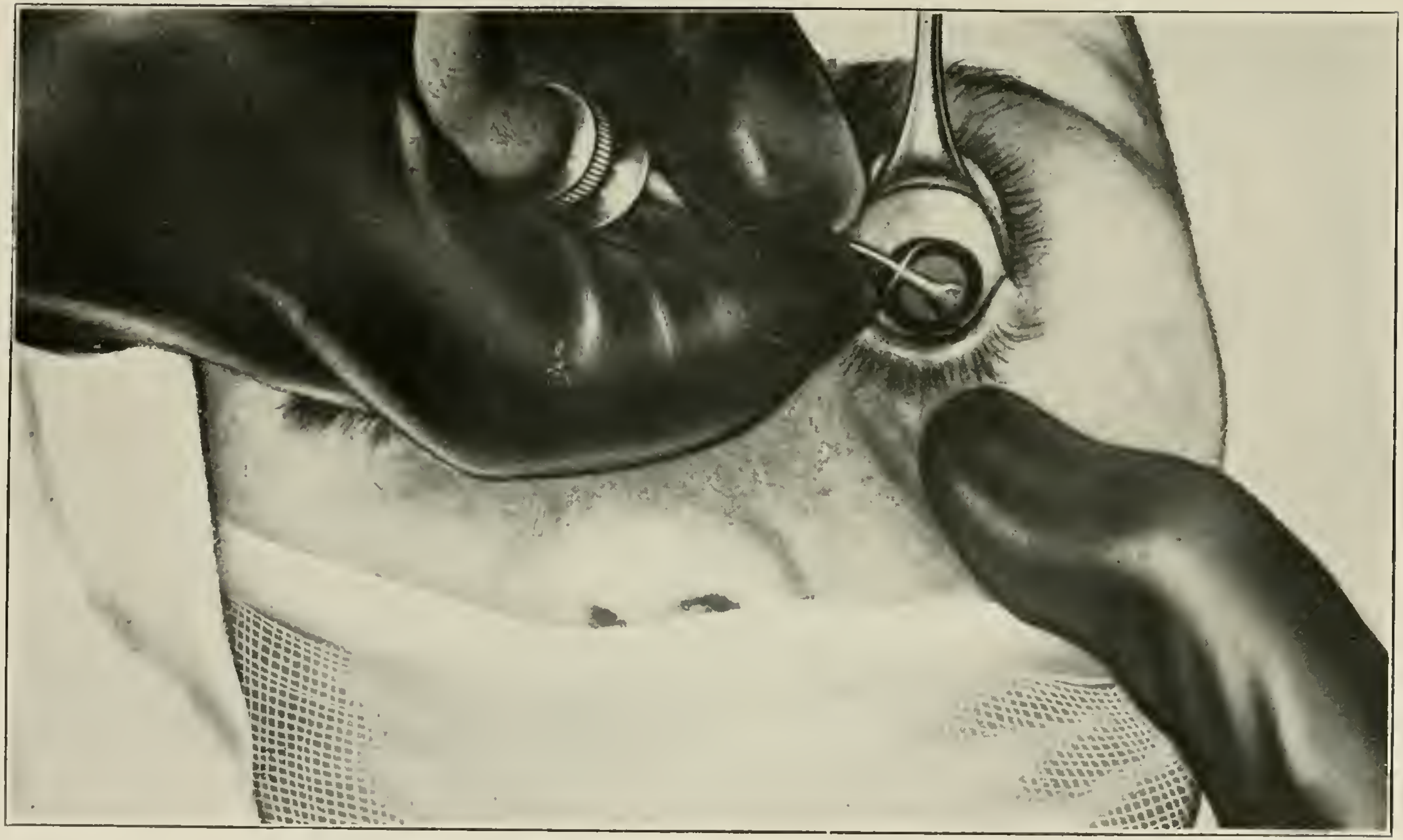
BARRAQUER'S CATARACT OPERATION—*continued*



The incision—2nd stage

PLATE III.

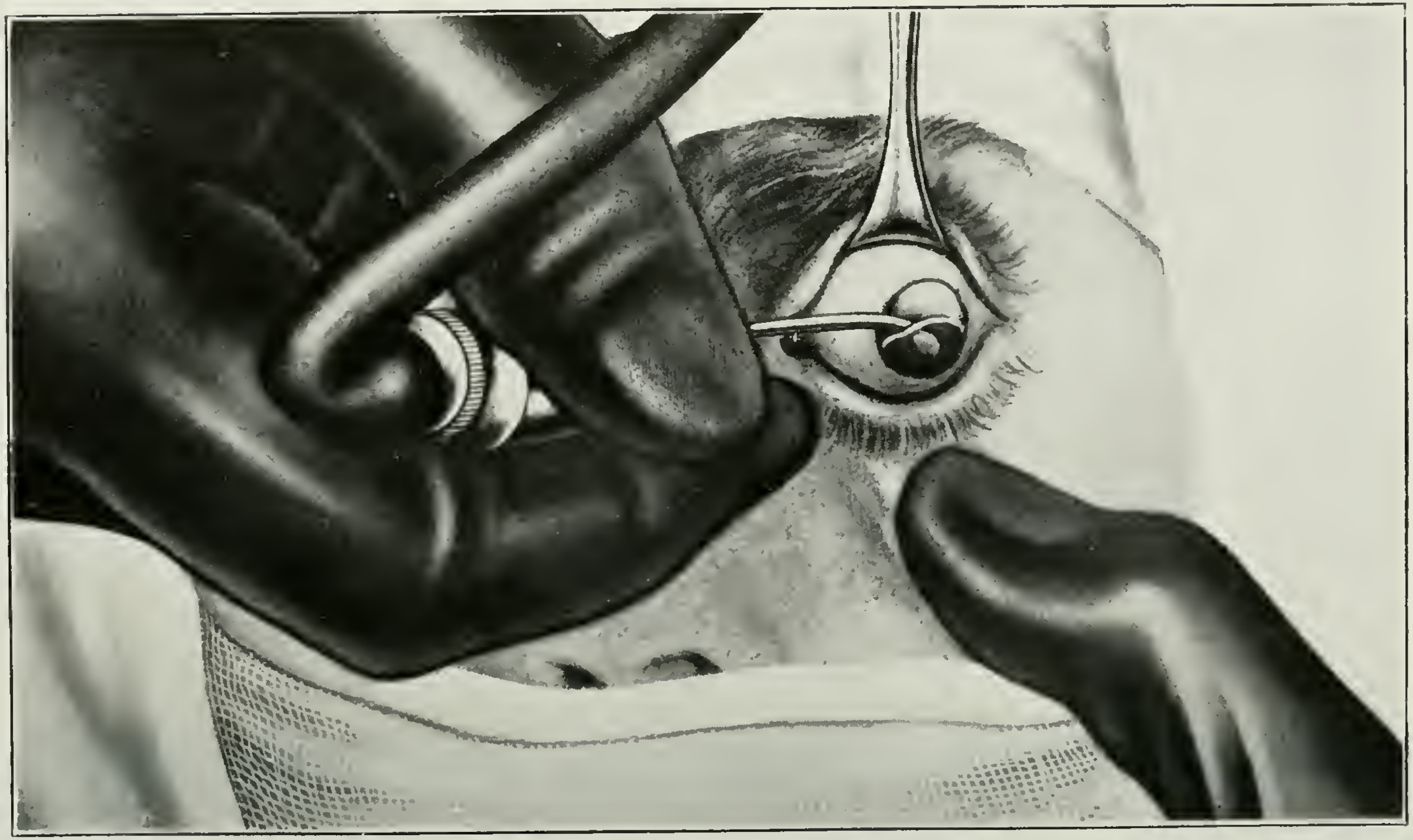
BARRAQUER'S CATARACT OPERATION—*continued*



Application of the erisophake.

PLATE IV.

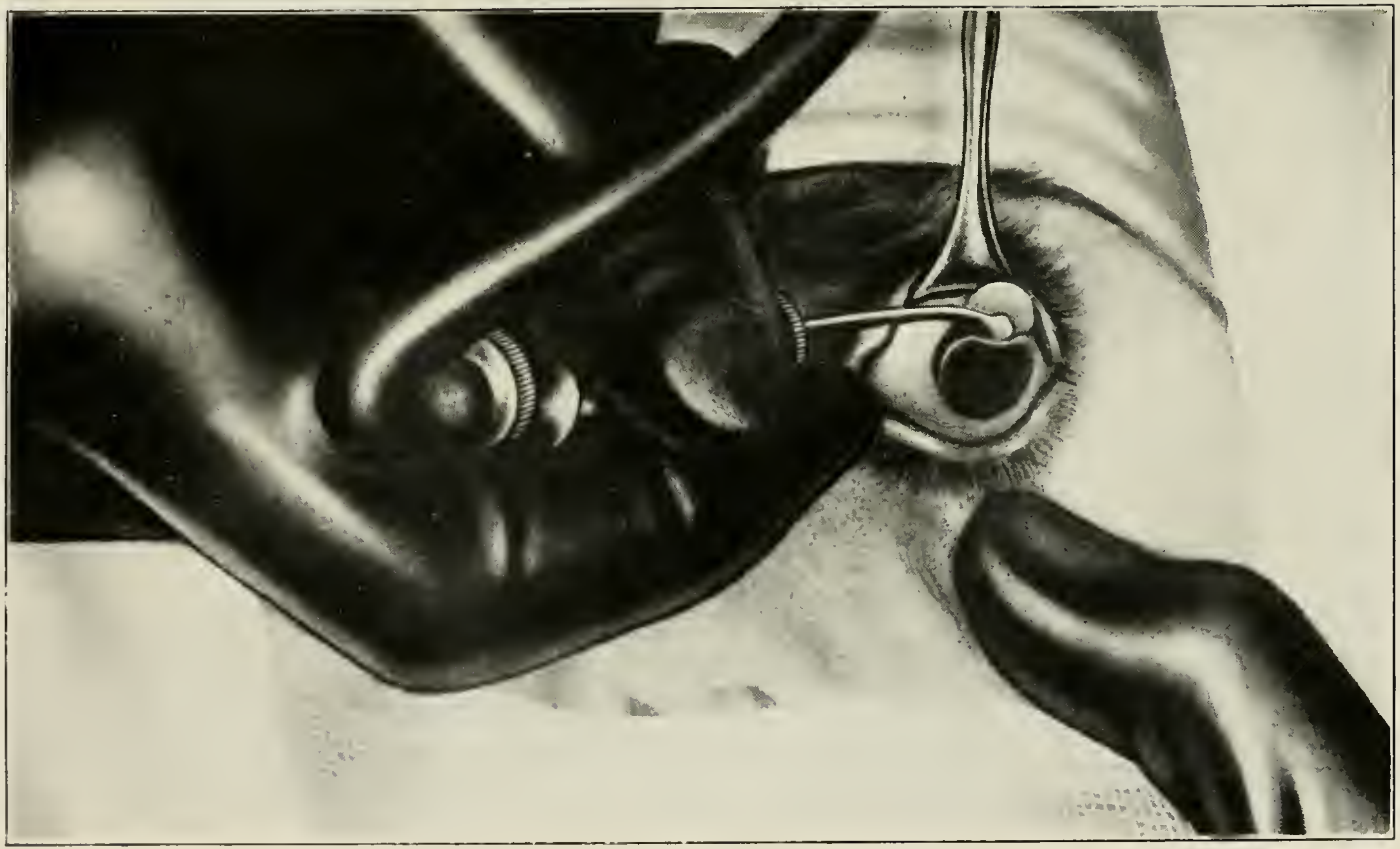
BARRAQUER'S CATARACT OPERATION—*continued*



Extraction of lens with the erisophake—1st stage.

PLATE V.

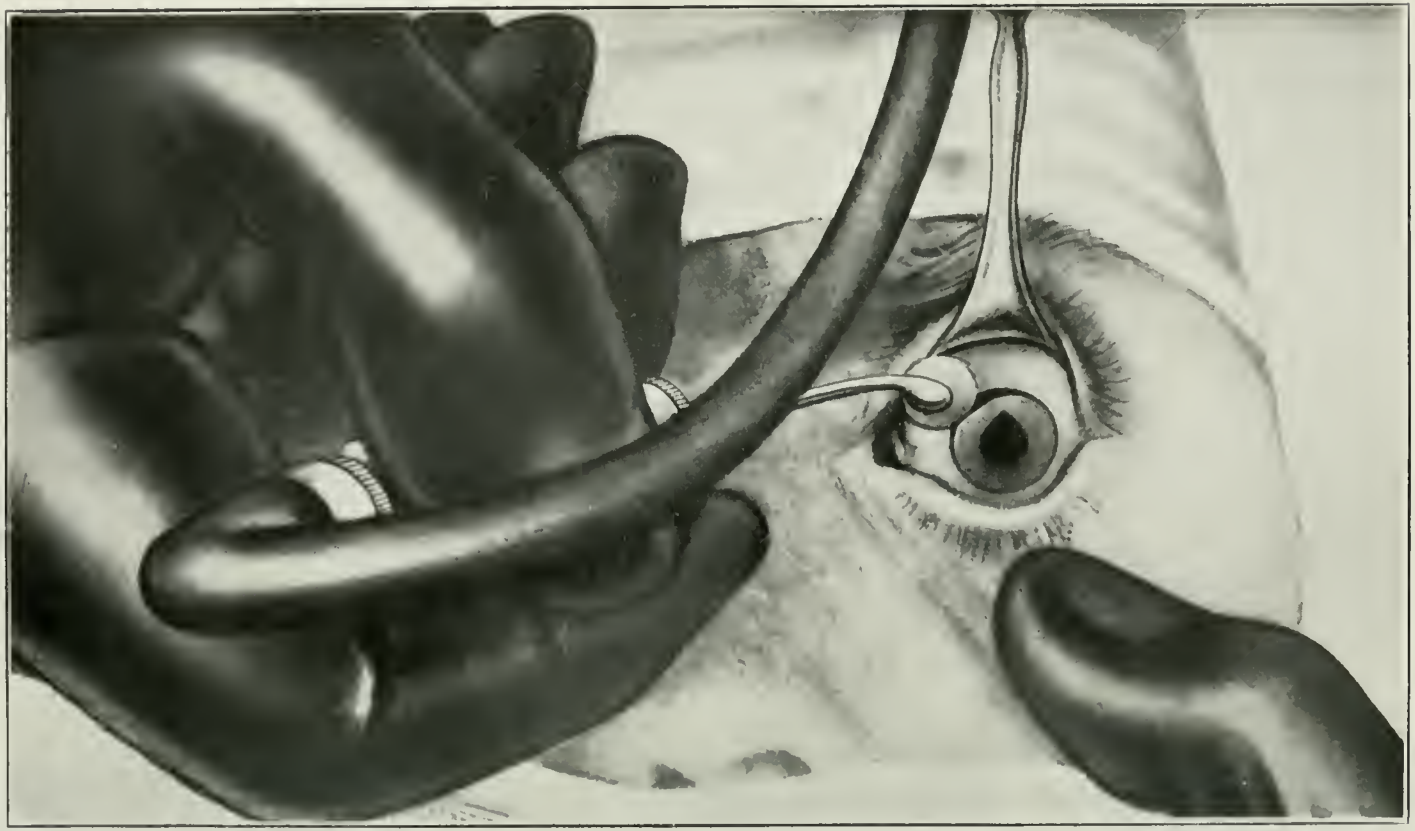
BARRAQUER'S CATARACT OPERATION—*continued*



Extraction of lens with the erisophake—2nd stage.

PLATE VI.

BARRAQUER'S CATARACT OPERATION—*continued*



Extraction of lens with the erisophake—3rd stage.

most likely thing to do this is pain. We believe that if operators would invariably see that the patient is perfectly cocainized; make an incision which admits of the lens emerging easily; see that their hold of the iris during the iridectomy is of the lightest, and avoid pinching it, thereby causing pain; and avoid also screwing up the stop of the speculum in nervous patients, much trouble would be avoided. Beginners are apt not to appreciate the importance of these points, and more experienced operators from time to time neglect them. The time taken to complete the operation is often also an important factor. Many patients' nerve and self-control remain good for a certain period only, the duration of which varies considerably. Other things being equal, the surgeon who completes his operation within that period will avoid many perils into which a slower operator may fall.—A. E. J. L.]

Early Escape of Vitreous.—Gifford[11] thinks that if vitreous begins to escape before the lens is out in a cataract operation, and the operator has not prepared for it by dissecting up a large conjunctival flap and inserting stitches with which this flap can be quickly brought down to reduce the escape of vitreous to a minimum, he should stop the operation, allow the wound to heal, and deal with the lens later by some safer method: (1) By leaving the lens till the other eye has been operated on; (2) By discission; (3) By preparing for vitreous loss by means of the conjunctival flap mentioned above. He has tried all three with greater or less success. Formerly he used to do all his peripheral expressions with a sliding flap, which avoids having to stop the operation. It was very successful, but took too much time. He recommends it where trouble is anticipated.

Delirium after Cataract Operations.—W. A. Fisher[15] emphasizes the importance of getting the medical history of old people before operating for cataract. Wherever possible a friend should remain the whole time with them in hospital. On the slightest tendency to delirium they should be awakened, if possible, and kept awake. He relates an interesting case of a man who had violent delirium. After being awakened he slept naturally, and in the morning told the nurse of a terrifying dream he had been having before being awakened.

Post-Operative Infection.—V. Morax[16] found the pneumococcus the most frequent cause of ocular infections after cataract operations. Out of 35 cases, 21 were due to the pneumococcus. Human serum must be added to the culture medium, otherwise its frequency may be overlooked. He has tried the use of antipneumococcic serum before operation. Out of 300 cases, 1 developed iritis, 3 iridocyclitis; 1 eye was lost, pneumococci being found in the eye. He found the use of a weak oxycyanide of mercury lotion before operation in certain cases was of value. It appears to depress the vitality of the micro-organisms and reduce the risk of infection. Diabetes, in his cases, had not rendered the risk of failure greater.

Kuhnt[17] treated two cases of *infection of the wound* with pneumococci, which occurred on the fourth and ninth day, by opening up the wound in its whole extent and extracting the pupillary exudate and capsule. The opening up of the wound and letting out of the aqueous humour was repeated daily until a cure resulted, which took place in about thirteen to sixteen days.

Stieren[18] describes three cases of *glaucoma* following apparently quite successful cataract operations. The cases had good vision, open pupils, and quiet eyes for varying periods of time. He points out that perimeters are of no use in diagnosing such cases, as, with the correcting lens worn, the prismatic effect of the edge so narrows the field that the examination is totally unreliable; without the lens, small targets cannot be seen. The ophthalmoscope is of little value, as it is most difficult to recognize a cupping in the small image seen. Diagnosis depends upon the tonometer and the history of failing vision in simple cases; and of sudden nauseating pain, with the congestive picture, in acute cases.

REFERENCES.—[1]*Arch. d'Ophtalmol.* 1921, Feb., 65: [2]*Brit. Jour. Ophthalmol.* 1921, May, 194; [3]*Ibid.* 194; [4]*Ibid.* 210; [5]*Jour. Amer. Med. Assoc.* 1921, Jan., 73; [6]*Amer. Jour. Ophthalmol.* iii, 643; [7]*Jour. Amer. Med. Assoc.* 1919, Oct., 1193; [8]*Amer. Jour. Ophthalmol.* 1920, Aug., 561; [9]*Bull. Soc. franc. d'Ophtalmol.* (abstr. *Brit. Jour. Ophthalmol.*), 1920, Nov., 521; [10]*Amer. Jour. Ophthalmol.* 1921, 445; [11]*Ibid.* 1920, Jan., 23; [12]*Brit. Jour. Ophthalmol.* 1921, Jan., 24 (*Clin. Ophtalmol* 1920, April); [13]*Amer. Jour. Ophthalmol.* 1920, iii, 726; [14]*Arch. of Ophthalmol.* 1921; [15]*Amer. Jour. Ophthalmol.* 1920, Oct., 741; [16]*Oxford Ophthalmol. Congress*, 1921 (not yet reported); [17]*Zeits. f. Augenheilk.* 1913, 328: [18]*Amer. Jour. Ophthalmol.* 1921, 424.

CEREBRAL ABSCESS. (*See* EAR, MIDDLE, DISEASE OF.)

CEREBRAL SURGERY. (*See* NEUROLOGICAL SURGERY.)

CEREBRAL TUMOURS. (*See also* EPILEPSY; NEUROLOGICAL SURGERY.)

J. Ramsay Hunt, M.D.

Tumours of the Hypophyseal Duct.—Duffy[1] emphasizes the relative rarity of squamous epithelial tumours among hypophyseal neoplasms. Jackson in 1916 tabulated 38 examples collected from the literature, to which Duffy adds 12 cases. On the basis of this material the following conclusions are reached. Although there are embryological possibilities for growth of squamous epithelial neoplasms between the pharynx and the sella turcica, the great majority of such tumours develop from squamous epithelial embryonic rests of the hypophyseal duct, either in the infundibulum or beneath the upper surface of the anterior lobe of the hypophysis.

In view of the fact that most of these tumours are suprasellar in position right from the beginning, and that nearly all assume this position early, it appears that they are especially suitable surgically for an intracranial approach. In tumours which arise beneath the capsule of the anterior lobe, the latter becomes flattened out below, and a trans-sphenoidal approach may destroy the entire anterior lobe of the hypophysis.

The hypophyseal duct tumours histologically may be divided into three groups. *Group* 1 is that of the papillary cyst or intracystic papilloma, which is histologically the most benign type of hypophyseal duct tumours. *Group* 2 includes the uncalcified or calcified adamantinomas (solid or cystic), the rarer tumours which closely resemble the basal epithelioma of skin. The tumours of this group may show criteria of local malignancy, but do not metastasize. *Group* 3 comprises a very rare group of cases which show all the earmarks of malignant spindle-cell carcinoma and may metastasize extensively to the cervical lymphatics.

During operations on suprasellar cysts in intimate contact with the floor of the third ventricle, microscopic demonstration of squamous epithelium from the lining of the cyst will assure the surgeon that the cyst (or solid tumour) originated below the ventricle. A pathological fact of importance for the surgeon to appreciate is the intimate and delicate relation of such cysts with the floor of the ventricle, from which they are frequently separated only by a very thin membrane.

The very frequent occurrence of the clinical syndrome of dystrophia adiposogenitalis (Fröhlich) in patients suffering with hypophyseal duct (squamous epithelial) tumours makes the pathological findings in the genital organs of particular interest. In the uterus of a twenty-year-old girl there was an atrophic endometrium, almost equal to that of the senile type, associated with cessation of the process of ovulation (ovaries). The testes of a thirty-five-year-old man showed a marked atrophy of the spermatogenous epithelium.

PLATE VII.

CEREBRAL TUMOURS

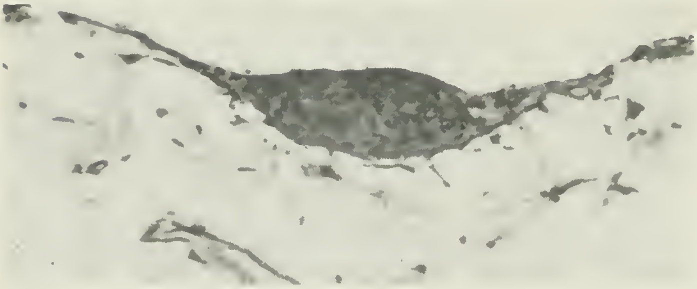


Fig. A.—Photomicrograph of section of arachnoid membrane covering posterior portion of left lateral sulcus of brain of old cat, showing thickening of mesothelial cells to form arachnoid cell-cluster. Above the membrane is the subdural space; below, the arachnoid trabeculæ appear traversing the subarachnoid space. (× 210.)

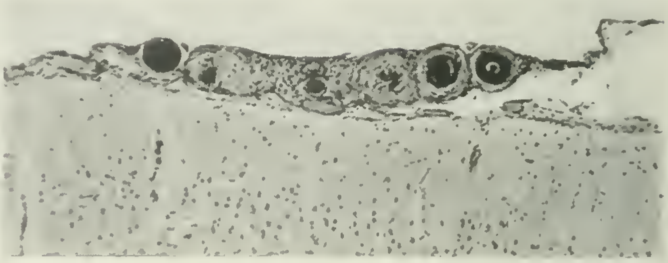


Fig. B.—Photomicrograph of section of arachnoid membrane and brain (right parasylvian gyrus) from an obviously old cat. The arachnoidal cell-cluster exhibits, in addition to several small and irregular calcareous deposits, typical spherical calcified bodies. Around certain of the calcareous nodules whorl-formation in the mesothelial cells is indicated. (× 55.)

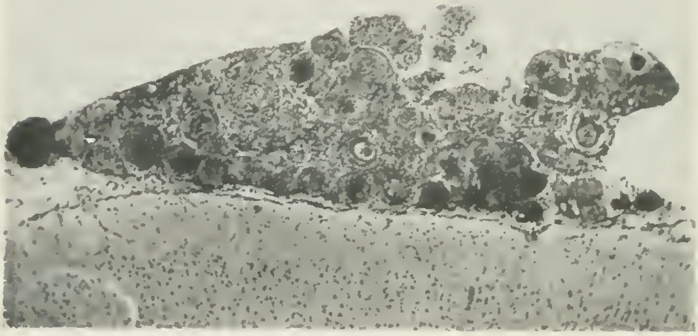


Fig. C.—Photomicrograph of section of leptomeninges and brain (coronal sulcus) of obviously old and weakened cat. Above in the leptomeninges is shown an early, well-localized endothelioma with typical cell-whorls and calcified bodies. (× 38.)

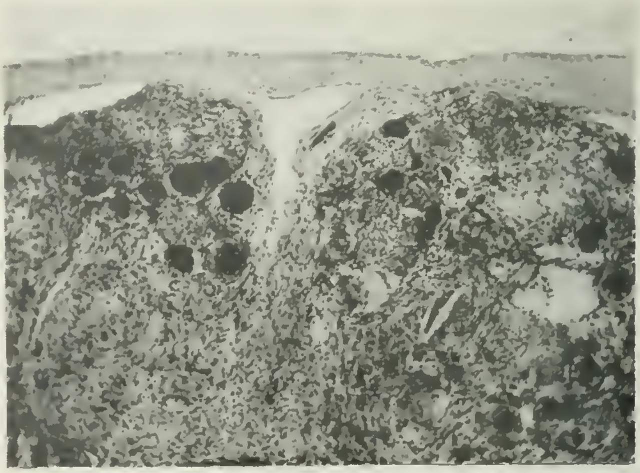


Fig. D.—Photomicrograph of section of dura and tumour mass from brain (left Sylvian fissure) of obviously old cat. The tumour is a typical endothelioma, and is intimately attached to the dura, which appears above. (× 10.)

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The Cells of the Arachnoid and their Relation to the Formation of Endothelioma.—During the past few years there has been evident in the literature a renewed interest in the physiological anatomy of the leptomeninges. The published studies have been primarily devoted to the arachnoid and the pia mater as constituting a membranous pathway for the cerebrospinal fluid. In the earlier years attention was paid merely to the morphology of the cells lining this fluid-containing subarachnoid space. More recently, however, the combined work of several investigators has afforded a more definite and concise conception of the morphology of these lining cells, so that it now becomes possible to present data regarding the changes in form of these cells under certain physiological conditions, and to describe other changes apparently resulting from the age-condition of the animal at the time of study.

L. H. Weed,[2] in an interesting contribution on this subject, states that normally, in the resting state, the cells covering the arachnoid membrane on its outer surface and lining the subarachnoid space are of a low flattened form; this morphological character changes with alteration of the physiological state and in the altered conditions of advancing age. Thus, in response to the stimulus of particulate matter, the arachnoidal cells enlarge, become phagocytic, and multiply, some becoming under appropriate conditions free-moving macrophages in the subarachnoid space. An essentially similar response of the cells occurs in the early stages of certain acute infections of the meninges. That the cells of the arachnoid react in a similar way to such widely varying stimuli would indicate that the phenomenon is the morphological expression of an essentially similar alteration in the functional state of the cells.

A second change of significance in the cells of the arachnoid membrane is that of the slow hyperplasia of the mesothelial elements to form well-localized cell-clusters in the membrane. These cell-masses occur in adult animals, particularly in those in which signs of advanced age are not apparent. The phenomenon of this cell-overgrowth has not been observed in young animals in any instance; the hyperplasia is determined apparently by the age-condition of the particular animal. These cell-clusters are the seat of the very common process of calcification in the arachnoid membrane, and the cell-cluster should be considered to be the primary change in the membrane, permitting subsequent degeneration and infiltration with calcium. On the other hand, in certain of the series of cats described, a much more intensive proliferative process had taken place in the meninges, to result in the formation of typical endotheliomata. The evidence indicates that certainly, in at least some of the cases, these new growths represent similar but much more hyperplastic reactions of the same arachnoid cells that are involved in the formation of the much smaller, more slowly growing arachnoid cell-cluster. The exact cell-origin of such new growths could not of course be told with exactness, but many features of similarity in the two types of growth suggest that this true new growth is the proliferative end-result of the arachnoid cell-cluster, while the very frequent process of calcification in these cellular nodules represents the degenerative. (*Plate VII.*)

The significance of the very slowly growing arachnoid cell-clusters must remain somewhat speculative. Their invariable occurrence in the older cats suggests that this cell-overgrowth resulting in the formation of such cell-clusters is merely a phenomenon of senescence. It seems most fair to look upon the arachnoid cell-cluster as an overgrowth of the arachnoid mesothelium, conditioned by the age of the animal, and representing an almost inevitable alteration of advancing age.

REFERENCES.—[1]*Arch. of Internal Med.*, 1920, Dec., 725; [2]*Johns Hop. Hosp. Bull.* 1920, Oct., 343.

CEREBROSPINAL FEVER.

J. D. Rolleston, M.D.

Bacteriology.—M. H. Gordon,[1] in a study of the endotoxin of the meningococcus, found that increase in the virulence of the meningococcus resulting from animal passage was not necessarily accompanied by a rise in its endotoxin content. As a means of obtaining meningococcus endotoxin, autolysis was not sure enough to be satisfactory. Distilled water proved to be superior to the other solvents tested for extracting endotoxin from the meningococcus. The addition of dilute sodium hydrate increased the solvent power of water and did not destroy the endotoxin. Meningococcus endotoxin withstood heating for thirty minutes to 100° C., and in some cases to 120° C. for that time, but was destroyed within two hours at 120° C. By heating the coccus for not too long a time in dilute alkali to 120° C. the endotoxin became distributed through the fluid.

Symptoms.—According to J. H. Root,[2] who records a fatal case in an infant five weeks old, meningococcus meningitis, though a common disease in later infancy and childhood, is extremely rare during the first two months of life. He has been able to find only 6 cases in the literature of meningococcus meningitis occurring in infants under two months of age, and only one of them had associated hydrocephalus as in the case reported by himself. The symptoms of *cerebrospinal fever in the newborn and in early infancy* are usually irregular and obscure. The most important are repeated convulsions, vomiting (not projectile), and, after a week or more, bulging of the fontanelle and rigidity of the neck.

A. L. M. F. Pierron[3] devotes his Lyons thesis to the consideration of *cerebrospinal fever in old age*, his conclusions being as follows: (1) Cerebrospinal fever in patients over 60 is chiefly found in a sporadic form. (2) The disease at this age has a special symptomatology, which is characterized by an insidious, but occasionally apoplectiform, onset; headache; vomiting; ocular manifestations, such as ptosis, nystagmus, and paralysis of the oculomotor nerve; and a more or less complete or intermittent coma. The pulse is irregular and the temperature only slightly raised. There may be some transient paralysis. Kernig's sign appears early and is very pronounced. Nuchal rigidity is ill-marked and may be entirely absent. (3) Owing to the latency of the symptoms and the difficulty of diagnosis it is possible that cerebrospinal fever in old age is more frequent than the statistics indicate. (4) In a patient over 60 in a comatose condition who presents signs, however slight, of meningeal irritation, one should not hesitate to perform lumbar puncture, as in this way alone can the diagnosis be settled and the prognosis improved by an early and active treatment. The gravity of the prognosis of cerebrospinal fever is shown by the mortality of the disease at various ages: in the infant under 2 years of age, 42·3 per cent; from 3 to 5 years, 26·7 per cent; in the adult, 39·4 per cent; and in old age, 80 per cent. The 6 cases reported by Pierron in patients from 59 to 72 years of age were all fatal.

According to C. Worster-Drought,[4] two types of *hydrocephalus* are met with in cerebrospinal fever: (1) Generalized hydrocephalus, in which an increased amount of cerebrospinal fluid is present throughout the subarachnoid space, both in the ventricles and externally, without obstruction of Magendie's and Luschka's foramina. The symptoms are practically those of internal hydrocephalus, but in a somewhat less severe form, viz., headache, lethargy, vomiting, tremulousness, and dilated pupils; the temperature usually rises, but may remain at its previous level. (2) Internal hydrocephalus due to the occlusion of Magendie's and Luschka's foramina, or to a lack of mechanical resistance offered by the ventricular walls to the total increase of fluid and internal pressure. Treatment of generalized hydrocephalus consists in early and repeated **Lumbar Puncture,** performed twice daily if necessary. If symptoms of internal hydrocephalus arise, such as lethargy, incontinence, persistent vomiting, tremulousness, general hyperæsthesia, dilated pupils, and possibly nystagmus, and if no fluid can be obtained on lumbar puncture, the subarachnoid space must be drained above the site of obstruction either in the dorsal or cervical region. If lumbar, dorsal, and cervical punctures all fail to yield cerebrospinal fluid, **Sphenoidal Puncture,** according to the method of Bériel and Cazamian, or **Puncture of the Lateral Ventricles,** should be employed.

Serre and Brette[5] record two cases of unilateral non-suppurative *parotitis* occurring at the end of an attack of cerebrospinal fever, and regard the complication as the result of a blood infection rather than of an ascending infection from the mouth. They allude in support of this view to a case of meningococcal septicæmia, recently reported by Lemierre and Lantuéjoul, in which parotitis was associated with orchitis and thyroiditis.

J. Dumont and Baron[6] report a case of very severe cerebrospinal fever in a man, age 40, complicated by *urethritis* and then orchitis. Examination of the cerebrospinal fluid and urethral pus showed that the causal organism was a parameningococcus. The patient had never had gonorrhœa, and the condition cleared up completely under treatment with antimeningococcic serum. This is apparently the first case on record of acute suppurative urethritis complicating cerebrospinal fever, though histological urethritis in this disease has been described by Florand and by Sabrazès and Bellegarde.

C. Shearer and J. R. Parsons[7] confirm Levinson's discovery that in cerebrospinal fever there is marked *acidosis of the cerebrospinal fluid,* and consider that this peculiar acidosis in meningococcal infection, in contradistinction to what is found in other meningeal infections, is probably due to the ease with which the meningococcus can break down the glucose in the cerebrospinal fluid, forming lactic acid. They suggest that the striking difference frequently seen between the clinical symptoms and the number of meningococci present is due to the degree of acidosis. If the cerebrospinal fluid contains less than the normal amount of glucose, or the particular strain of meningococcus is unable to form the usual amount of acid, the patient's fluid will show but slight change in reaction from the normal condition, although large numbers of meningococci may be present. In such cases the absence of any marked acidosis of the cerebrospinal fluid would account for the mild clinical symptoms.

P. Ribierre, P. Hébert, and M. Bloch[8] record 7 cases of *meningococcal septicæmia,* in 3 of which there was no meningitis at all, and in 4 the meningitis did not occur until a late stage. The clinical picture was characterized by three principal symptoms: (1) Fever of an intermittent type; (2) An eruption which was most frequently nodular in character but was sometimes macular or petechial; (3) Arthropathies.

Prognosis.—According to G. Raisin,[9] the prognosis of cerebrospinal fever is worst at the extremes of life (infancy and old age), and when the disease is associated with other morbid processes, especially alcoholism or strain. As a general rule, symptoms indicating depression are more serious than those of excitement. Apart from purpura, which indicates a very severe form of septicæmia, no single clinical symptom is sufficient to establish a prognosis.

A. M. Servais[10] describes the following changes in the classical type of the disease to which he attributes the failure of serum treatment, even where it is employed early and in large doses: (1) The frequency of relapses, the prognosis of which is very grave, owing to the likelihood of fatal anaphylaxis, the resumption of serum treatment being required at a time when anaphylaxis is most likely to occur; (2) The frequency of septicæmic forms, especially of purpura; (3) The frequency of re-activation of old brain lesions; (4) The association of the meningococcus with the pneumococcus, the virulence of which has been constantly exalted during the last few years until it reached its height during the epidemic of influenza.

Prophylaxis.—During an epidemic of cerebrospinal fever in a district in Uganda in 1918–19, J. A. Taylor[11] employed applications of **Tincture of Iodine** (B.P.) mixed with an equal quantity of native **Honey** to the tongue of contacts, two or three times daily. The rationale of the method was as follows: (1) The local disinfectant action; (2) The action of the increased flow of saliva, which in itself is prohibitive to the growth of organisms; (3) The action of iodine after absorption; (4) The excretion of the iodine in the saliva and respiratory passages again acting as an antiseptic.

O. Thomsen and F. Wolff,[12] who describe a small epidemic of cerebrospinal fever among recruits lodged in barracks, make the following recommendations: (1) During the first weeks of their military service recruits should be kept apart as much as possible from older drafts; (2) Recruits should be given the most hygienic quarters in barracks in preference to older soldiers; (3) When the latter are selected for training the recruits, they should first be examined for meningococci, which, if present, should disqualify them for this post.

Treatment.—C. Worster-Drought[13] states that it is best to begin with a **Serum Valent** for *Types* I, II and III (Gordon), unless it is definitely known that a particular type has occurred with frequency in other cases of the same origin. The minimum period for continuance of serum administration should be four days irrespective of the apparent improvement in the patient's condition. The usual dose should be 30 c.c., except when less than this quantity can be obtained. In children the following doses are recommended: 1 to 5 years, 10 to 15 c.c.; 5 to 10 years, 10 to 20 c.c.; 10 to 19 years, 20 to 40 c.c. In addition to serum, Worster-Drought gives somewhat larger doses of **Vaccine** than those usually employed. In adults a dose of 250 million organisms is injected subcutaneously during the first three days of the disease, the second dose consisting of 500 million, and each of the subsequent doses being increased by 500 million up to a maximum of 2500 million, with four days between the doses. If the reaction to a particular dose is at all pronounced, the same dose is repeated four days later, when usually there is no reaction, and the increase of 500 million is made at the subsequent injection. In children the initial dose may be 10 million, the next 50 million, and each subsequent dose increased by 100 million. A polyvalent vaccine is given at first, and is replaced by an autogenous vaccine as soon as the latter is available.

U. N. Brahmachari[14] refers to the case recorded by Widal which was treated by intrathecal injection of collargol (*see* Medical Annual, 1908, p. 187), and reports 9 cases, 4 of which were very severe and 2 fatal, which were treated by **Spinal Irrigation** and **Electrargol**. After one or two ounces of cerebrospinal fluid had been withdrawn by lumbar puncture, a dilute solution of electrargol (1–10) was introduced by a 'Record' syringe and allowed to come out through the needle after the foot of the bed had been raised two or three minutes; 15 c.c. were introduced at a time until nearly 10 c.c. had been used. A small amount of electrargol was allowed to remain inside. The irrigation was performed every third or fourth day. In cases which recovered there was a rapid fall in the temperature, diminution in the muscular rigidity, and of the delirium or coma.

References.—[1]*Jour. R.A.M.C.* 1920, ii, 362; [2]*Amer. Jour. Dis. Child.* 1921, i, 500; [3]*Thèses de Lyon*, 1919–20, No. 72; [4]*Jour. Neurol. and Psychopathol.* 1921, 309; [5]*Med. Science*, 1920, iii, 224; [6]*Bull. et Mém. Soc. méd. Hôp. de Paris*, 1920, 1460: [7]*Quart. Jour. Med.* 1921, 120; [8]*Med. Science*, 1920, iii, 226; [9]*Ibid.*; [10]*Ibid.* 227; [11]*Brit. Med. Jour.* 1921, i, 776; [12]*Med. Science*, 1921, iv, 258; [13]*Jour. Neurol. and Psychopathol.* 1920, 11; [14]*Ind. Med. Gaz.* 1920, 332.

CEREBROSPINAL FLUID. (*See also* MULTIPLE SCLEROSIS ; NEUROLOGICAL SURGERY.)

O. C. Gruner, M.D.

1. *Pressure.*—Barre and Schrapf[1] estimate that the normal pressure, measured with the Claude manometer, is 20 cm. when the subject is reclining, and 40 cm. seated with the head drooping. Anything over 25 and 45 cm. respectively is abnormal, and may be called hypertension.

2. *Protein Content.*—Denis and Ayer[2] advocate a colorimetric test, using a nephelometer to compare the protein suspension obtained by adding a solution of sulphosalicylic acid to the fluid, with a standard solution prepared with the protein obtained from fresh normal human blood-serum. The method was controlled with careful nitrogen analyses. *Fig.* 17 represents their results in graphic form.

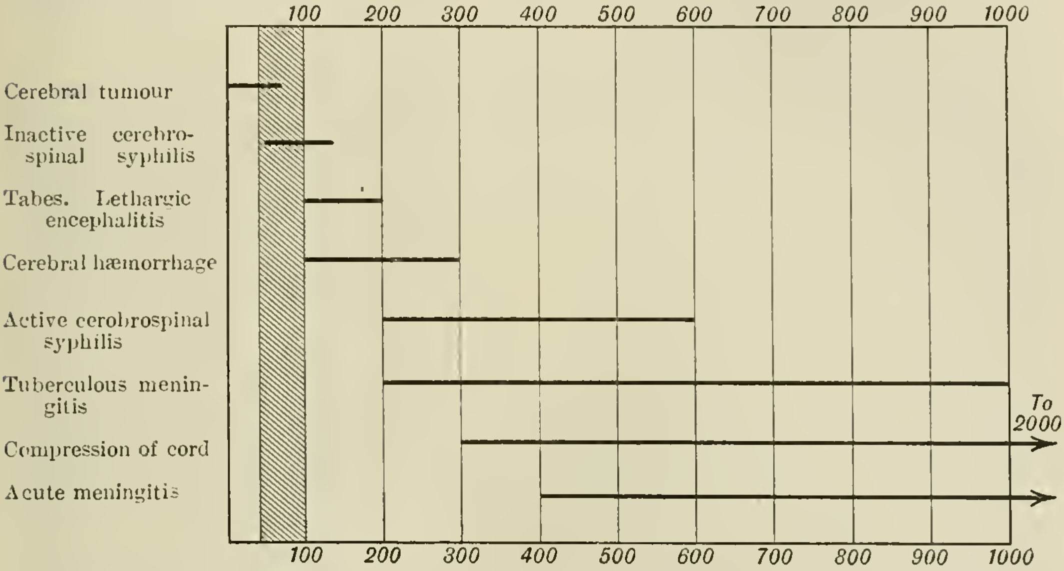


Fig. 17.—Protein level in pathological cerebrospinal fluids. The shaded area shows the normal range. The length of each horizontal line shows the range in the corresponding disease. The figures show the number of mgrms. of protein per 100 c.c.

Noguchi[3] describes another method of estimating the protein content, based on the flocculation of lipoids. The reagent consists of : (1) An alcoholic extract of acetone-insoluble tissue lipoids ; (2) A solution containing 0·5 c.c. glacial acetic acid, 10 c.c. saturated solution of picric acid in absolute alcohol, 1·5 grm. acid potassium phosphate, and 4 grm. sodium chloride, in distilled water to make a total volume of 1000 c.c. The full details of preparing and preserving this reagent are best seen in the original. One part of the alcoholic extract is carefully added to 9 c.c. of the second component. The actual test consists in placing 0·1 c.c. cerebrospinal fluid into a test-tube 10 by 1 cm., and adding 1 c.c. of reagent. A normal spinal fluid remains perfectly clear. Copious precipitation means excess of protein, significant of disease. This test supplements the well-known butyric acid reaction.

3. *Cholesterol Content.*—Levinson, Landenberger, and Howell[4] have investigated this subject by the Bloor method published in 1916, and by that of Hauptmann published in 1910 (saponin hæmolysis). They conclude that the amount of cholesterol in morbid cerebrospinal fluid depends wholly or in part on the degree of permeability of the meninges, and has no specific pathogenesis. It occurs in traces in all cases of meningitis, and in considerable amount in cases of hæmorrhage of the brain. It is seldom present in fluids which give positive Wassermann and Lange reactions. The general results may be tabulated as follows :—

CHOLESTEROL IN CEREBROSPINAL FLUID.

Condition	Bloor method (mgrm. cholesterol per 100 c.c.)	Hauptmann method (graded 1–5. 5 = max.)	Wassermann reaction
Normal	0·0	0	Nil
Cerebral hæmorrhage ..	8·0	1	Nil
Meningeal ,, ..	17·0	2	Nil
Meningitis	14·1	–	Full
Tuberculous meningitis ..	10·2	–	Nil
Pneumococcic ,, ..	19·0	2	Nil
Cerebral abscess	13·0	5	Nil
General paresis	13·3	5	Full

4. *Yellow Colour.*—Levison[5] finds that there are many conditions which may cause a yellow spinal fluid. These conditions are so varied that the colour itself is of no diagnostic value. However, it always means an organic lesion or infective process, except in those cases in which serum has been injected intraspinously. The cause of the colour is either bilirubin or minute hæmorrhages. Increased coagulability of the spinal fluid is more pathognomonic than the xanthochromia itself. Such a phenomenon always means an obstructive lesion of the spinal canal.

5. *Other Tests.*—Guillain and his co-workers[6] describe a simple *benzoin precipitation test.* It is always present in cerebral syphilis. The reagent is made thus: 1 grm. benzoin is dissolved in 10 c.c. alcohol; in 48 hours 0·3 c.c. of the supernatant fluid is transferred to 20 c.c. distilled water; it is heated to 35° C. An extremely homogeneous suspension now results. Method: 1 c.c. of this reagent is added to each of six tubes containing the diluted cerebrospinal fluid. Dilution is carried out with 0·1 per cent sodium chloride. The first tube has $\frac{1}{4}$ c.c. of diluent, $\frac{3}{4}$ c.c. of fluid; the second has $\frac{1}{2}$ c.c. of each; the third has 1·5 c.c. diluent, $\frac{1}{2}$ c.c. fluid; the fourth has 1 c.c. diluent and 1 c.c. from the third tube; the fifth has 1 c.c. diluent and 1 c.c. from the fourth tube, 1 c.c. of the mixture being then thrown out; the last tube has only the diluent in it. Read in 12 to 24 hours. Precipitation is complete in syphilis.

REFERENCES.—[1]*Bull. méd.* Paris, 1921, iv, 65; [2]*Arch. of Internal Med.* 1920, Oct., 436; [3]*Jour. Amer. Med. Assoc.* 1921, March 5, 632; [4]*Amer. Jour. Med. Sci.* 1921, April, 561; [5]*Arch. of Internal Med.* 1920, Oct., 459; [6]*Bull. Soc. méd. Hôp. de Paris*, 1920, Nov. 5, 1299.

CERVICAL RIBS.

Sir W. I. de C. Wheeler, F.R.C.S.I.

Much attention has been attracted to this condition within recent years. Cervical ribs may be mistaken for rudimentary first dorsal ribs, but a count of the vertebræ will make this clear (*see* MEDICAL ANNUAL, 1921). Stiles, at the American Congress of Surgery, Philadelphia, October, 1921, has drawn further attention to compression neuritis due to the normal first dorsal rib. Anything which causes a descent of the shoulder (which occurs normally at puberty, in women), such as fracture of the clavicle, may result in compression of the nerve trunks. In addition, there may be angulation and pinching of the subclavian artery as it ranges over the extra rib, and the consequent pulsating tumour may simulate an aneurysm. Cabot has said that a pulsating mass about the clavicle means a cervical rib nine times out of ten.

Some authorities attribute the circulatory changes in the forearm and hand to the pressure upon sympathetic fibres in the lower cords of the brachial plexus. Others say these changes in the circulation are due to mechanical obstruction of the subclavian artery in the neck. Law[1] discusses this question, and draws attention to *adventitious ligaments simulating cervical ribs.* In the cases of some of the shorter and more rudimentary ribs, he states that the forward projecting tips are occasionally attached by a definite ligament to the first rib or to the sternum. In one such case, the ligaments attached to the rudimentary ribs were explored, and a ligament was found arising from the normal seventh transverse cervical process, and inserted into the first rib at the scalene tubercle, with the scalenus anticus muscle. The ligament was as taut as a bow-string (*Fig.* 18), and the two lower cords of the brachial plexus and the subclavian artery were stretched over it. Since the first case noted in 1916, three others have been operated upon. Radiographic study, although revealing no adventitious ribs, showed a pulling down of the last cervical transverse process closer to the transverse process of the first dorsal vertebra than was shown on the normal side. Law also draws attention to trophic changes in the finger-bones in such cases.

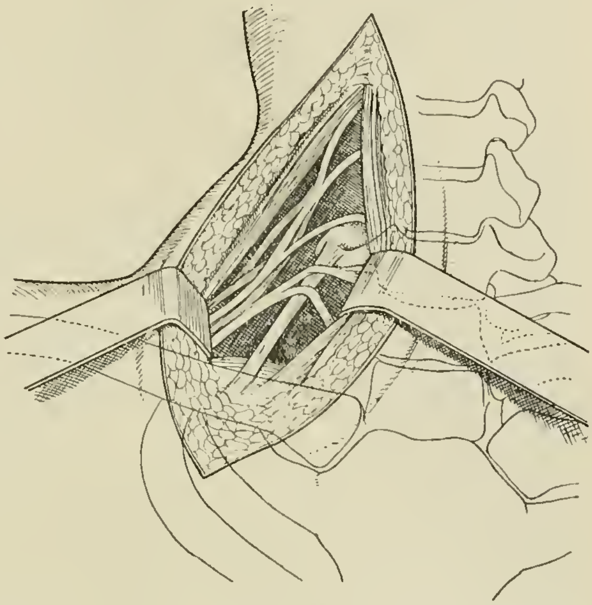


Fig. 18.—Schematic drawing showing angulation of lower cords of brachial plexus over adventitious ligament. *Re-drawn from the 'Annals of Surgery.'*

Reference.—[1]*Ann. of Surg.* 1920, Oct., 497.

CHANCROID.

Colonel L. W. Harrison, D.S.O.

L. Cheinisse[1] reviews recent literature on the treatment of bubo. Bodin considers that buboes due to Ducrey's bacillus are less resistant to treatment than those resulting from pyogenic cocci. Dubreuilh and Mallein mention certain conditions for the success of Fontan's method of injecting **Iodoformized Vaseline,** amongst which are that the bubo must have softened completely, and that there must be no tendency of the skin over the bubo to become chancroidal. Also the pus must be evacuated completely so that the vaseline may come intimately into contact with the walls. He considers as a contra-indication to Fontan's method the presence of syphilitic adenitis in conjunction with the suppurative process, having had two cases in syphilitics where a fistula remained and required subsequent operation. Hudelo and Rabut's modification of Fontan's method, viz., the use of Bory's **Iodoformized Xylol**[2] has gathered many adherents. Contrary to Dubreuilh and Mallein, Hudelo and Rabut insist that it is better not to wait for complete softening. The opening should be big enough to allow of complete evacuation, though not exceeding a length of 10 mm. Reenstierna uses with success intramuscular injections of **Antistreptococcic Serum** with **Antityphoid Vaccine,** as in gonococcal metastases (*see* Gonorrhœa); almost all the buboes thus treated were well in eight days. [The reviewer can testify to the value of intravenous injections of **Electrargol** in suppurating bubo.—L. W. H.]

Morini[3] employs a modification of Somogyi's method, injecting the cavity after evacuation with an emulsion consisting of **Iodoform,** 10; **Rectified Spirit,** 20; and very pure neutral **Glycerin,** 80. Morini adds to this 5 per cent each of **Camphor** and **Guaiacol** to make the injection painless. A small incision is made in the most prominent part of the bubo, but no attempt to express all the pus at once. The injection is made with a glass syringe, giving just enough to fill the cavity, and a gauze pad is applied fairly tightly. The maximum time for healing is stated to be eight days ; the average is five.

References.—[1]*Presse méd.* 1920, Oct. 23, 757 : [2]*Med. Annual*, 1921, 110 ; [3]*Riforma med.* 1920, xxxvi, 1046 (abstr. in *Surg. Gynecol. and Obst.* 1921, March, 243).

CHEST, SURGERY OF. (*See* Thoracic Surgery.)

CHICKEN-POX.

J. D. Rolleston, M.D.

Symptoms.—M. Stroh[1] states that the *incubation period*, in the few of the 234 cases of varicella at the Frankfort children's clinic in which it could be traced, was thirteen or fourteen days. An *enanthem* in the mouth was noted in only 19. Severe *gangrene* developed in two children with coincident scarlet fever. In one case varicella ran a *hæmorrhagic course* with internal bleeding, but final recovery. *Nephritis* developed in three cases. The *blood* as a rule showed a reduction in the number of leucocytes at the height of the disease, while a leucocytosis was in favour of variola.

Two cases of *anomalous and complicated* varicella are reported by I. Iankoff[2] in children 23 months and 2½ years old respectively in whom the lesions were umbilicated and the eruption confluent. In one case the attack was complicated by acute infective colitis, and in the other by profuse choleriform diarrhœa. Both recovered. The elder brother of one of the patients had so mild an attack that it almost escaped notice. The elder sister, on the other hand, had a febrile attack of a week's duration without any eruption apart from a solitary bulla at the base of the uvula. Iankoff comes to the following conclusions : (1) Confluence of the eruption in varicella is rare but not impossible ; (2) The vesicles in varicella fairly often undergo umbilication, so that this phenomenon should not exclude varicella ; (3) In extremely rare cases varicella may abort and escape notice (*see also* Medical Annual, 1921, p. 507) ; (4) In exceptional cases the alimentary canal may be involved.

According to J. A. Rossen and M. C. Woodruff,[3] *varicella in the adult* presents a marked difference in the distribution of the lesions to that seen in the child. While it is unusual to find many lesions on the child's face, quite the reverse is true in the adult, in whom the face, as in variola, may often show as many lesions as other portions of the body. The types of lesions on the trunk, however, present an appearance quite different from those on the face and extremities, so that the diagnosis between varicella and variola is easily established.

F. H. Thomson[4] records a case of a *second attack* of varicella in a boy of 5½ years, who had a history of having previously suffered from chicken-pox, and presented old scars on the forehead and chest identical with those left by that disease. In the second attack the eruption was typical.

S. Meyer[5] *inoculated* 38 children with the contents of chicken-pox vesicles by scarification. Of these, 13 showed a local reaction in the form of papules and vesicles, and 25 had no local reaction ; 5 of the former subsequently developed typical varicella towards the end of the third week after inoculation, though in each case the attack was extremely mild. Of the 25 who were inoculated without any local reaction, 12 developed generalized varicella sooner or later after inoculation, but all after termination of the incubation period for the normal infection. Of 39 children who were not inoculated, 19 developed varicella, but the character of the attack was much milder in the inoculated than in the uninoculated. Meyer concludes that inoculation against varicella is not a reliable preventive measure in all cases, but that it appears to guarantee a mild attack whether there is a local reaction or not.

Numerous writers[6] record further cases of the *association of herpes and varicella*, but without offering any satisfactory explanation of this curious relationship (*see also* MEDICAL ANNUAL, 1919, p. 464; 1920, p. 386; 1921, p. 507).

REFERENCES.—[1]*Jour. Amer. Med. Assoc.* 1920, ii, 1461; [2]*Arch. de Méd. des Enf.* 1920, 714; [3]*Jour. Amer. Med. Assoc.* 1921, i, 961; [4]*Lancet*, 1921, i, 378; [5]*Med. Science*, 1920, iii, 141; [6]*Brit. Med. Jour.* 1921, i, 227, 228, 284, 382, 600, 673, 891, 1340; *Lancet*. 1921, i, 691.

CHOLERA.

Sir Leonard Rogers, M.D., F.R.C.P., F.R.S.

ETIOLOGY.—R. W. Mendelson[1] reports on an epidemic of cholera at Bangkok, the capital of Siam, which illustrates well the beneficial effects of a filtered water-supply in the absence of other sanitary advantages. The main eastern portion of the city had a good water-supply and the morbidity-rate was 1·376 per mille, while in the western portion with an impure natural supply the rate was 9·42 per mille. The onset of heavy rain caused a temporary increase of cholera by causing temporary extreme pollution of all natural water-supplies from the contaminated soil in the absence of a proper conservancy system. Vegetables grown on nightsoil-fertilized land were an important source of infection. The outbreak is leading to important sanitary improvements. J. C. Tull[2] reports on an outbreak of cholera in works of the Burma Oil Company, in which flies, aided by close proximity of the cook-houses and latrines, played the main part in the infection, which was only controlled when the lines were evacuated. In both these outbreaks the hypertonic saline treatment was used with advantage.

S. R. Douglas[3] has investigated the serological reactions of cholera vibrios, and concludes that there is only one type. F. G. Clemow[4] records the incidence of cholera in the Turkish Empire since 1914.

TREATMENT.—Several papers on the treatment of cholera during the 1919 epidemic in China record the results obtained. H. Braafladt[5] found **Hypertonic Saline** best in the collapse stage, losing only 22 per cent of these serious cases. In early milder cases **Kaolin** gave good results. J. H. Wylie[6] had a mortality of only 14·5 per cent with Rogers' methods, including **Permanganates** in doses up to 188 to 248 gr. in a case, and also used kaolin, which allayed sickness. J. A. Snell[7] also used the same methods of treatment with good results, and advises the use of permanganates in enemas. Hyperpyrexia caused most deaths.

R. R. Walker[8] records experiments showing that kaolin can absorb and render inert cholera toxins, and he had good results from its employment in an epidemic of cholera in Foochow in 1919. A large supply of half-and-half suspension of the powder in water was placed near the patients, who were encouraged to drink as much as possible, and rectal lavage was done with kaolin solution thickened to allow of its passing comfortably through the rectal tube. In bad cases bilateral subcutaneous saline infusions were given, and in desperate ones Rogers' hypertonic saline was given intravenously. Vomiting was first controlled, then the diarrhœa stopped, and later urine reappeared, and rapid convalescence ensued. The powder may act partly mechanically, but mainly by absorbing the toxins and preventing their absorption from the bowel; it has no antiseptic action on the vibrios, so the stools require disinfection. F. P. Mackie and J. C. Gupta[9] record the results of Rogers' alkaline hypertonic and permanganate treatment in Calcutta in 298 cases with a mortality of only 21 per cent. The causes of death were suppression of urine in 25, cardiac failure in 29, and abortion in 2. L. Rogers[10] records tables illustrating the mortality and prognosis in 2000 cases treated by his methods, and points out the factors influencing the mortality, including the season, age, specific gravity of the blood, blood-pressure, alkalinity of the blood, rectal and axillary temperatures, and the number of saline injections administered. [Only an abstract of this paper has been published, but the tables will appear in full in the writer's new edition of *Bowel Diseases in the Tropics.*—L. R.]

REFERENCES.—[1]*Jour. Trop. Med. and Hygiene*, 1921, 1 ; [2]*Ibid.* 1920, 373 ; [3]*Brit. Jour. Exper. Pathol.* 1921, April, 19 : [4]*Lancet*, 1920, ii, 1215 : [5]*China Med. Jour.* 1920, 243 ; [6]*Ibid.* 252 ; [7]*Ibid.* 253 : [8]*Lancet*, 1921, ii, 273 ; [9]*Ind. Med. Gaz.* 1921, 201 ; [10]*Lancet*, 1921, i, 1079.

CHOREA.

Frederick Langmead, M.D., F.R.C.P.

ETIOLOGY.—H. Thursfield,[1] in a lecture on this subject, refers to its geographical and social distribution. Geographically it is localized to the temperate zone, and apparently to the civilized communities. It is fairly common everywhere in Northern Europe and America, comparatively rare in Southern Europe, and little known in Asia. It is uncommon in Australia, and almost unknown in South Africa. In Great Britain it is more particularly a disease of the urban and suburban population, though in some parts it is met with in agricultural districts. Socially it is confined almost entirely to the hospital class.

He is convinced of the intimate relation between chorea and rheumatism, and considers that it should more properly be regarded as a complication of rheumatism than as a separate disorder. The figures which indicate the frequency of the association are well known.

Some authorities hold that another form of chorea apart from the rheumatic also exists. Thursfield does not acknowledge this.

Cecil Wall[2] takes a contrary view with regard to the etiology, and believes that chorea is a symptom resulting from disordered function rather than a single disease : that in the great majority of cases this disorder is brought about by the rheumatic state, but that at times other causes may be operative.

TREATMENT.—The line of treatment which Thursfield[1] advocates may be summarized as follows :

1. Rest in bed.
2. A search for any port of entry of the infecting organisms : the tonsils should be scrutinized carefully and, if at all suggesting chronic inflammation, should be removed ; similarly attention should be paid to the teeth.
3. **Sodium Salicylate,** continued over a long period, rather with a view to preventing further infection than combating that already present.

Recently he has treated a few cases with **Sensitized Vaccines** made from organisms isolated from cases of acute rheumatism. The dosage has been from 5 to 30 millions every other day and sometimes every day. On two occasions, at least, he has been impressed by the rapidity with which the disorder disappeared under this treatment.

Besides these two remedies, the drugs which have obtained some reputation may be divided into two classes : those given to moderate the excessive muscular movements, and those given as tonics. **Bromide, Chloral,** and similar drugs come into the first class ; **Arsenic** and its allied preparations into the second. With regard to the former, he has not seen any benefit other than that of procuring sleep ; and concerning the latter, it is generally agreed that it is necessary to give amounts which may possibly produce unfortunate results.

In particular cases, symptoms may demand special treatment. Thus there are cases where the movements are of such violence as to preclude rest or sleep, and even the taking of food. Such patients must be restrained and protected so that they do themselves no harm. When ordinary hypnotics fail, he considers it good practice to anæsthetize the patient deeply, and while she is still unconscious to give by a nasal tube a moderate quantity of milk.

After the disappearance of the exaggerated movements, **Massage** and **Passive Movements** are of service, and **Electrical Baths** or **Faradism** to the limbs if the loss of power is severe. The period of convalescence should be long, and the child should not return to school for at least two, and if possible three, months.

REFERENCES.—[1]*Clin. Jour.* 1921, March 23, 177; [2]*Lancet*, 1920, ii. 1081.

CICATRICES. (*See* KELOIDS AND CICATRICES.)

CŒLIAC DISEASE..

Frederick Langmead, M.D., F.R.C.P.

There is a disposition to regard cœliac disease as much rarer than it really is, for its attributes are little appreciated by the profession and it often goes unrecognized. Its main features are malnutrition, the passage of bulky, grey, offensive, and pultaceous stools, general abdominal distention, pallor, an altered mental attitude in the direction of querulousness and introspection, and bouts from time to time of diarrhœa, during which the stools are fluid and often contain mucus and less often blood. Analysis shows that the characteristic bulky stools consist largely of soaps, a finding which corresponds with the clinical features, for difficulty in dieting is a formidable obstacle, and the difficulty is especially in regard to fats. In severe and protracted cases delay in development, both mental and physical, is added, a condition resulting which has been called, with reason, intestinal infantilism; while rickets is no infrequent associate.

R. H. Miller, J. Webster, and H. Perkins[1] have studied three cases from the points of view of their fat digestion and the clinical and analytical alterations produced by the administration of **Bile-salts.** All that could be done in the first two cases was to put each child on a constant diet and analyze specimens of the fæces before and during the administration of the bile-salts. The results were encouraging, but the method fails to overcome the difficulty of the possible variation of the fat-content of the stools from day to day, even on a constant diet. This source of fallacy was avoided in the third case: the child was put on various diets containing known quantities of fat, and specimens from a three-days' collection of fæces were analyzed. All this was repeated during the administration of the bile-salts. Unfortunately, however, the only case available was in a quiescent stage, the stools being as nearly normal as is ever the case. No harmful effects were observed from the bile-salts even after periods of many weeks. Their presence could not be recognized with certainty in the urine, so that they are largely excreted by the bowel. They tended to diminish the diarrhœa. The salts were given in water with alkali and a flavouring agent, 1 gr. each of **Sodium Glycocholate** and **Sodium Taurocholate** being administered three times a day with the principal meals.

The authors draw the following conclusions from their investigation:—

1. *Percentage of Fat in the Stools.*—In the first two cases, in which the stools were unformed and typical of cœliac disease, the percentages of fat in the dried fæces were 57·14 and 52·4. These figures correspond with those of Cammidge, Willcox, and Herter. In the third (quiescent) case, the percentages of total fat were still slightly above the normal figure, and were from 24 to 28. It would appear, therefore, that even in quiescent stages the absorption of food-fat is rather below the normal, and that cœliac disease is associated with some causative anomaly which waxes and wanes rather than comes and goes, a contention supported by the clinical study of the disease.

2. *Fat Absorption and Utilization.*—The only figures of value in this regard are those of the third case, which show that, during a quiescent stage, increasing

the daily intake of fat not only increases the absolute amount of fat absorbed daily, but even the percentage of the food-fat absorbed. It is therefore unwise perpetually to starve the patient of fat. In active stages, however, the fat in the diet should be reduced.

3. *Fat-splitting.*—There was no sign of any defect in this, so that the deficient fat absorption cannot be ascribed to defective fat-splitting. There was some improvement in fat-splitting during the administration of bile-salts, probably through the lessening of peristalsis accompanying the improved fat absorption. Though not absolutely conclusive, the absence of deficient fat-splitting is strong evidence against a pancreatic source for the disease.

4. *Treatment by Bile-salts.*—In the third, or quiescent case, the fat wastage in the stools was only slightly above normal, and the splitting and utilization of the food-fat were good before the administration of bile-salts. While they were being given the motions became more firm and dry; while, by analysis, there was great reduction in the amount of water in the fæces, and a slight improvement in the absorption, splitting, and utilization of fat. In the other two cases the disease was showing active symptoms. There was a distinct drop in the percentage of fat in the fæces, combined with an increase in the patient's weight, no alteration having been made in the diet—improvements which have not occurred without the bile-salts. The evidence suggests that during stages of fatty diarrhœa in cœliac cases bile-salts may cause an improvement in absorption; while in quiescent stages their action is much slighter.

5. '*Late Rickets*' *as a Manifestation.*—In one of the cases rickety changes occurred at the age of seven years. The authors comment on the rareness of late rickets in a disease in which there is so much reduction of fat absorption.

6. *Urinary Diastase Test.*—The figures obtained in this test were considerably heightened in each case when bile-salts were being administered; but no attempt is made to explain the significance of this change, which was within normal limits.

7. *The Pancreas in Cœliac Disease.*—In nine cases studied by one of the authors (R. H. M.) he has never found any positive evidence of pancreatic disease. In the only autopsy, the pancreas and its ducts were normal; true steatorrhœa he had never seen; creatorrhœa he had not observed; in two tested cases the stools gave clear evidence of proteolytic activity by the casein test. The urinary diastase test (4 cases) had always given numbers within normal limits; Loewe's pupil test had always been negative; there had been no evidence of defective fat-splitting.

In a further paper, R. H. Miller[2] describes a fatal case of the disease in which post-mortem examination failed to show any chronic changes in the pancreas, liver, intestine, or elsewhere. He discusses in detail the only autopsies hitherto recorded in cases of at all a similar nature (3 in all) and argues that the intestinal changes found in them do not prove the excessive fat-loss in cœliac disease to be due to an enteritis. For these and other reasons he concludes that cœliac disease is independent of organic changes and must be due to a digestive fault (probably a defective action of the bile on fat-absorption).

REFERENCES.—[1]*Lancet*, 1920, ii, 894; [2]*Ibid.* 1921, i, 743.

COLI BACILLURIA. *Herbert French, M.D., F.R.C.P.*

Vaccine Therapy.—Mauté[1] discusses the treatment of this condition by vaccines. His experience during the past ten years of 150 cases had led him to the conclusion that the ordinary stock or autogenous vaccines were not, except in about 25 per cent of the cases, of greater efficiency than ordinary treatment with rest and urotropine. The use by others of modified or detoxicated vaccines indicated a similar application to this condition, and a vaccine was prepared as follows: 10 mgrm. of coli, weighed moist, is added to sufficient decinormal soda to effect solution in twelve to twenty-four hours at 37°. The solution, which is perfectly clear and faintly yellow, is then carefully neutralized with hydrochloric acid, and 0·5 per cent phenol is added to preserve it. Where neutrality is obtained, a faint colloidal precipitate appears, and this is injected with the vaccine, the use of the solution without the precipitate, or vice versa, failing to give the results obtained when both together are given. In acute cases 1 c.c. of the vaccine, which he calls **Coli Soda Vaccine,** is injected every second day until the temperature drops, when the same dose is given every fourth day until the bacillus disappears from the urine. If, however, it persists after 7 injections, a rest of from seven to ten days is allowed, after which the injections are resumed every fourth day for periods of 7 injections. In chronic cases, series of 7 doses of 1 c.c. every third day are given. The results in all forms of infection of the urinary tract have been very good, and no ill effects and violent reactions are noted. Thus, out of 10 acute cases, cure in five weeks resulted in 7 of them; while 14 out of 19 chronic cases were well after three and four series of injections. He emphasizes the necessity of conjunction with the surgeon in all cases in order that all appropriate local examinations and treatment may be given.

REFERENCE.—[1]*Presse méd.* 1921, June 4, 443.

COLON, CONGENITAL DILATATION OF. (*See* HIRSCHSPRUNG'S DISEASE.)

COLON, SURGERY OF. *E. Wyllys Andrews, A.M., M.D., F.A.C.S.*

Megacolon.—Ladd[1] reports five resection operations for megacolon, and discusses the medical and surgical treatment of the disease. As the etiology of the condition has not as yet been determined, our treatment can only be symptomatic. Theories that involve the presence of some obstruction must be discarded, as exploration rarely reveals this condition. Goebel,[2] however, in a recent paper still insists on spasm of the sphincter ani muscle as a factor. Nevertheless, the fact remains that in the vast majority of cases of fissure and other conditions causing such spasm no dilatation of the colon occurs. The sharply limited areas of enlargement are suggestive of local paralysis, but histologically the nerve-endings are intact. For these reasons both Ladd and Johnson,[3] who reports two cases, favour the congenital theory.

The outlook is bad. Cheever, in a discussion following the last-mentioned paper, stated his belief that few cases reached middle life. Ladd collected 118 cases. About one-half were treated medically, and the mortality was 67 per cent; even this probably represents too small a number, as it is likely that many died afterwards; only 12 per cent were cured. With surgery, the mortality was 41 per cent; 14 per cent were improved, and 45 per cent cured. These figures leave no doubt that operation should be done in all cases. Plication and fixation of the colon have not been any help. Short-circuiting has done no good and often has actually done harm. Resection of the dilated portion yields the best results. The fact that most of the mortality has come from sepsis suggests that preliminary colostomy should be used more often. Ladd did not find a thickened mesentery in any of his cases. Heavy Payer clamps must be used, as the ordinary intestinal clamps have not the strength to hold the enormously thickened bowel wall. The greatest technical difficulty lies in the fact that, although it is possible to get to normal bowel above, the dilatation extends to the rectum below, and a very large opening, with thickened edges and unhealthy tissue, must be sewn to normal bowel. Lateral anastomosis is the best, and part of the opening in the lower segment should be closed first. A large tube passing through the opening out of the rectum is very important.

Viscentini,[4] on the other hand, reports a successful result of plication of the colon for Hirschsprung's disease. He has made a study of the literature, especially of Italy, on the subject, and in his opinion these plastic operations are safer, and give as good results as removal.

Cancer of the Colon.—At a symposium on surgery of the colon at the Medical Society of London,[5] papers were read by Moynihan, Lane, Lockhart-Mummery, and Carson. A similar series of papers was read at the Congress of the Italian Society of Surgery,[6] by Giordano, Mattoli (an exhaustive monograph on the subject), Bastianelli, and numerous others. Certain points were brought out in nearly every paper, and are as follows :—

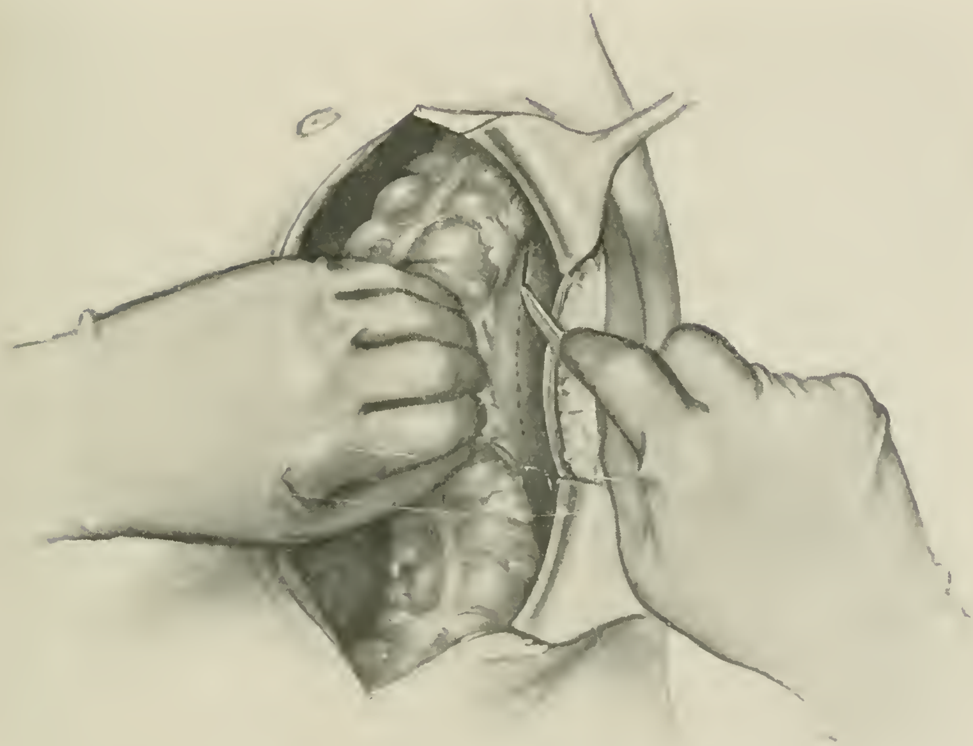
The early diagnosis is especially important in cancer of the large bowel. It is the most benign form of cancer in the body. Metastases are few and late, and recurrences after operation comparatively few. For example, in a series of over 100 autopsies, over half showed the disease limited to the bowel. However, most cases come to the surgeon complaining of *acute* obstruction, or they simply feel a tumour. Surely, education of both the layman and the general practitioner should make earlier diagnosis possible. The earliest signs are slight pain, diffuse and colicky. It often comes on immediately after meals, and is of short duration. Frequently the patient interprets it correctly as a writhing or turmoil of the bowels. Gurgling is frequent and loud. Irregular bowel action, often an alternating diarrhœa and constipation, is significant. Actual slow-growing obstruction, as one might expect, is not only not the rule but is very rare. This is important to realize, as lack of this symptom has led surgeons astray many times. Such a history should always warn us of the necessity of making a special search for a bowel cancer. Search of the stools for blood, and radiography, will often confirm the diagnosis. Rectal injection of the bismuth gives much better results than taking it by mouth.

When the obstruction does come on, it is generally acute, stormy, and complete. This is one of the most serious features of the disease. Operation at this stage is very dangerous, shock is great, infection likely, and paralytic ileus after the operation is the cause of many deaths. Rest in bed for a few hours, morphine, and copious colonic flushings will sometimes relieve the obstruction, at least for a time, and the dangers of having to operate during a crisis be avoided. If these measures are not effectual, and intervention becomes necessary, many recommend drainage of the bowel above the point of obstruction as the first stage. If resection appears to be easy, it may be done at the first sitting, providing drainage of the upper segment be established at once, either by a tube if the tumour be near the rectum, or else by an enterostomy well above the site of the obstruction. An appendicostomy may be made for this purpose. In all serious cases, however, and with many surgeons as a routine in all obstructed cases, the two- or even the three-stage operation is being used with increasing frequency.

As to the technique, the importance of wide incisions is emphasized. This enables one to see and to cut the lateral leaf of the mesentery (Dowd[7]), and thus to mobilize the colon so that it may easily be delivered and the work done outside the abdomen (*Plate VIII*). No vessels are cut in this region, as they enter the bowel from the median side. Side-to-side anastomosis is the method of choice of most of the surgeons. In some cases, of course, this is impossible owing to the shortening, and in these cases the end-to-end method is preferable to an ileocolostomy ; such operations as partial exclusion, or short-circuiting, have caused a large amount of distress from the

PLATE VIII.

SURGERY OF COLON



Incision of outer leaf of peritoneum beside descending colon so as to secure suitable mobility of that part of colon.

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backing up of the intestinal contents in the blind loop. If this procedure is found to be unavoidable, the excluded loop should always be drained by an enterostomy.

REFERENCES.—[1]*Boston Med. and Surg. Jour.* 1921, Jan. 27, 81; [2]*Mitteil. a. d. Grenzgeb. d. Med. u. Chir.* 1920, xxii, No. 4: [3]*Boston Med. and Surg. Jour.* 1921, Jan. 27, 88; [4]*Policlinico*, 1921, April, 174: [5]*Lancet*, 1920, ii, 1185, 1252; [6]*Policlinico*, 1920, Nov. 21, 1353; [7]*Ann. of Surg.*, 1920, Dec.

CONGENITAL DISLOCATION OF HIP. (*See* ORTHOPÆDIC SURGERY.)

CONGENITAL HYPERTROPHIC PYLORIC STENOSIS. (*See* STOMACH, SURGERY OF.)

CONGENITAL SYPHILIS. (*See* SYPHILIS, CONGENITAL.)

CONJUNCTIVITIS. (*See* EYE, GENERAL AFFECTIONS OF.)

CONSTIPATION, CÆCAL.

Robert Hutchison, M.D., F.R.C.P.

Dr. J. C. Roux[1], the well-known authority on intestinal diseases, has written a valuable and interesting account of this special variety of constipation.

X-ray examination, carried out in a large number of cases, has furnished important information regarding the motor functions of the large intestine. The passage of chyle through the small intestine is rapid, and lasts only a few hours. A bismuth meal is found to be present in the cæcum and ascending colon six hours after being swallowed. From this point, however, its progress is slow. After eighteen hours it can be detected in the descending colon, and after from twenty-four to thirty-six hours the fæcal mass, which had accumulated in the sigmoid colon, is expelled from the rectum.

Retarded evacuation or ordinary constipation is generally due to stagnation of the fæces in the terminal section of the large intestine. Most frequently this is a mere mechanical trouble and does not present much importance, for the fæcal matter is dishydrated, has lost practically all microbial activity, and hence stagnation in this part of the intestine does not, as a rule, give rise to serious inconvenience. It is a very different thing when the progress of the fæces is arrested in the first part of the colon. Here retention of fæces is badly tolerated by the organism and gives rise to trouble.

Some years ago Roux described this variety of constipation, and gave it the name of cæcal constipation. Other authorities have called it constipation of the proximal colon, or the ascending type of constipation, but they all agree that it presents certain characteristics of its own, and that its prognosis is much more serious than that of the ordinary type.

SYMPTOMS.—The first symptom which patients especially complain of is a sensation of malaise which appears as soon as there is even a slight retardation in the evacuation of the intestine. Whereas in the ordinary form of constipation (i.e., stasis of the fæces in the descending colon) the patient may remain several days without passing stools and not experience any serious inconvenience, in cæcal constipation the suppression of stools, even for twenty-four hours, aggravates the general state of the patient, and the sensation of malaise increases rapidly. The patient complains of abdominal plenitude with slight nausea and headache; the tongue is coated and the appetite diminished. All these symptoms point to digestive intoxication.

The persistence of the trouble gives rise to anæmia and a state of cholæmia, with fatigue and nervous depression which, in predisposed subjects, very easily ends in a neurasthenic tendency.

The patient nearly always complains of abnormal sensations in the cæcal region. It does not amount to actual pain, but rather persistent discomfort lasting the whole day, increasing in intensity when the patient stands up or lies down on his left side. and also during the night towards two or three o'clock in the morning.

Patients of a nervous constitution do not sleep well ; they are troubled with nightmare, and frequently wake up suddenly in a state of terror, comparable with that seen in young children suffering from intestinal trouble. Sometimes a very painful crisis supervenes with its maximum in the right side of the abdomen, and ends with a profuse intestinal evacuation. In one patient, the crisis was usually accompanied by distention of the cæcum, which became so hard and tense that a medical man called in diagnosed a floating kidney. The symptoms and the localization of the pain often cause one to think of chronic appendicitis. Some of these patients have already been operated upon for appendicitis, but the persistence of pain after operation proves that if the appendix is frequently affected in these cases it is, however, not responsible for the symptoms. These patients, although suffering from habitual constipation, have every now and then attacks of diarrhœa. The latter generally come on after two or three days of constipation, and are followed by an improvement in the patient's state, and a diminution of the pain in the right iliac fossa. The diarrhœa is caused by irritation of the intestine due to fermentation and putrefaction of the fæces retained in the cæcum. At certain intervals diarrhœa may persist for a longer period of time, even several weeks, this being due to a more intense degree of intestinal inflammation, but gradually the trouble disappears and a state of chronic constipation returns. The diagnosis is confirmed by abdominal palpation, the whole region of the descending colon being painful to prolonged pressure. The cæcum is often found to be dilated, and 'clapotement' is present. During the periods of constipation the region is more markedly distended and tympanitic.

The differential diagnosis from chronic appendicitis is not always easy, for the appendix is often affected secondarily and then plays a rôle in the alterations of the ascending colon. When the pain predominates in the region of McBurney's point, one is naturally inclined to think of appendicitis, and sometimes the only way to establish a diagnosis is to observe the course of the affection. When, after an appropriate treatment, an improvement has been obtained in the evacuation of the colon and in the general state of the patient, but a distinctly localized pain still persists at the lower region of the cæcum, one may conclude that the appendix has been affected and its inflammation remains after the disappearance of the intestinal trouble.

Causes and Pathogeny.—Functional trouble of the ascending colon may be due to a mobile cæcum, frequently accompanied with the presence of false membranes ; to inflammatory pericolitis, or to cæcal ectasis. Abnormal mobility of the cæcum and ascending colon often gives rise to no trouble, but it may cause difficulty in the evacuation of the fæces, especially when membranous formations of congenital origin are present. Inflammatory pericolitis often follows an old attack of appendicitis or a chronic infection of the intestine ; and sometimes after cholecystitis, or ulcer of the duodenum, adhesions of inflammatory origin spread to the ascending and first part of the transverse colon, the hepatic curve of the intestine becomes fixed at an acute angle, and thus evacuation of the contents of this part of the intestinal track becomes difficult. Cæcal ectasis or atonic dilatation of the cæcum may follow serious inflammation of the inner coat of the large intestine or incomplete intestinal evacuation due to spasm of the transverse or descending colon.

All the above lesions have, as a common result, retention of fæces in the cæcum or in the first portion of the colon, and give rise to the symptoms described. As has already been mentioned, the retention of dry and sterile matter in the terminal portions of the intestine does not, as a rule, produce any very serious trouble, but when stagnation takes place in the cæcum, where the fæces are in a liquid state and bacterial activity still very intense, the residues of digestion, the carbohydrates, fats, and albumins, may give rise to toxic substances, which, when absorbed into the system, produce serious symptoms.

TREATMENT.—Two objects are to be kept in view: (1) To prevent the formation of toxic substances; (2) To procure a thorough evacuation of the ascending colon. The **Diet** should be carefully attended to. Experience has shown that nitrogenous substances are particularly dangerous, especially when they have not been acted upon by the gastric juice for a sufficient period of time. Albumins in solution, and especially lightly-cooked eggs, should be avoided; as a rule milk is not well borne; for the same reason meat, which is albumin in a solid form, and therefore retained a longer time in the stomach, is generally better tolerated, providing it is taken in small quantities.

In certain patients, with very active fermentation and formation of large quantities of gas in the colon, leguminous food, such as peas, beans, lentils, etc., should also be forbidden.

The diet should be primarily vegetarian. The following is a type of diet suitable in cases of intestinal putrefaction, when the attacks of pain and diarrhœa are rare:—

Morning Meal.—Tea or cocoa, prepared with water. Bread, butter, jam, or cooked fruit.
Midday Meal.—Thick soup, with rice or macaroni. Grilled or roast meat, or fish. Well-cooked potatoes or fresh vegetables. Pudding (semolina, tapioca, or rice). Fruit cooked or raw.
Four p.m.—Tea, bread with butter or cooked fruit.
Evening Meal.—The same as at lunch time, but without meat or fish.

In addition to an appropriate diet, a treatment which will prevent putrefaction in the ascending colon is indicated. Under the influence of putrefaction the contents of the cæcum become alkaline, and in order to restore the normal acidity, lactic ferments and curdled milk have been tried, but Carnot has obtained more satisfactory results by prescribing fairly large doses of **Lactose** first thing each morning.

The most important element of the treatment, however, is to secure the thorough evacuation of the cæcum. Violent laxatives which irritate the mucous membrane should be avoided. If **Paraffin Oil** suffices, so much the better, but if not, small doses of **Castor Oil** may be given. A good method is to prescribe very small doses of **Salines** diluted in a large quantity of water, to be absorbed each morning on an empty stomach. Fifty cgrm. or 1 grm. of sulphate of sodium and magnesia in a large tumblerful of water should be taken each morning, and a dose of **Agar-agar** at the midday and evening meals.

There are cases, however, which resist all medical treatment, and here a surgical intervention has to be considered, for the patient may become so weak that he is unable to carry on his ordinary occupations. Total removal of the ascending colon is a serious operation, and is too risky to become a routine treatment. Dr. Pierre Duval has performed **Cæcosigmoidostomy,** when the anatomical conditions were favourable, in several patients. This operation ensures, not a continuous and direct evacuation of the cæcum into the terminal colon, but a derivative route, which comes into action whenever there is obstruction to the normal evacuation of the cæcum. Surgical intervention, however, is at present, and will remain in the majority of cases, an exceptional method of treatment. An appropriate diet and medical treatment generally suffice to prevent cæcal constipation, and the accidents to which it gives rise.

REFERENCE.—[1]Abstr. in *Med. Press*, 1921, April 6, 279.

CORNEA, DISEASES OF.

Lt.-Col. A. E. J. Lister, I.M.S.

Roux[1] describes two cases of herpes of the cornea after antityphoid inoculation, and cites other cases. He calls attention to the necessity of early recognition and treatment, as thereby persistent leucomata may be avoided.

Kummel[2] has an interesting article on the effects of *x* rays on the structures of the eye, in cases in which they have been employed for the treatment of intra-ocular tumours, and describes a peculiar affection of the cornea produced by them. It is of interest to radiologists as well as oculists.

Ulcers.—Wessely[3] recommends the **Cauterization** of serpiginous ulcers of the cornea by **Steam** or **Alcohol Vapour.** He claims results superior to those obtained by the igneous cautery. He has experimented on the cornea of rabbits with a view to studying the effects produced. The macroscopic lesions produced are less than those of the cautery, the normal level of the cornea is restored more rapidly, and loss of transparency is less. The lesions produced damage the sight less. In artificial ulcers, vapour arrested the progress of the ulcer when progressive, in 100 per cent of cases; galvanocautery only in 25 per cent. The vapour acts on the germs deep in the cornea, which the igneous cautery does not reach, and is therefore superior to it.

H. Tuttle,[4] writing on *phlyctenular ulceration* in children, lays stress on excluding all sugar and starches from the diet, and giving meats, eggs, and oatmeal. Syrup of the **Iodide of Iron** is most useful internally. Locally he uses saturated solution of **Boric Acid** to wash the eye, and one drop of 25 per cent **Argyrol** every three to four hours. Finely-powdered **Calomel** is dusted on the ulcer once daily. **Yellow Oxide Ointment** is applied to the under surface of the upper lid once a day, and continued for a week after the ulcer is healed. In serpiginous ulcers in patients over 40, he flushes out the eye with 1–5000 **Bichloride of Mercury** lotion, and then always cauterizes the ulcer with an **Electric Cautery.** He has never failed to stop the spread of an ulcer by its use.

Operation for Keratoconus.—A. S. and L. D. Green,[5] reasoning from the effects of myotics on this condition, formed the opinion that it might be due to an intra-ocular tension too great for a weak cornea. They aim therefore at reducing the intra-ocular tension permanently. They have operated on two cases by a modification of Lagrange's **Sclerectomy** for glaucoma. A **Canthoplasty** is done also, to overcome the excessive pressure of the lids. Vision is improved and astigmatism lessened by the operation.

References.—[1]*Arch. d'Ophtalmol.* 1921, Feb., 112; [2]*Klin. Monats. f. Augenheilk.* 1921. 480; [3]*Arch. f. Augenheilk.* lxxx, 1; [4]*N.Y. Med. Jour.* 1921, 333; [5]*Amer. Jour. Ophthalmol.* 1920, iii, 429.

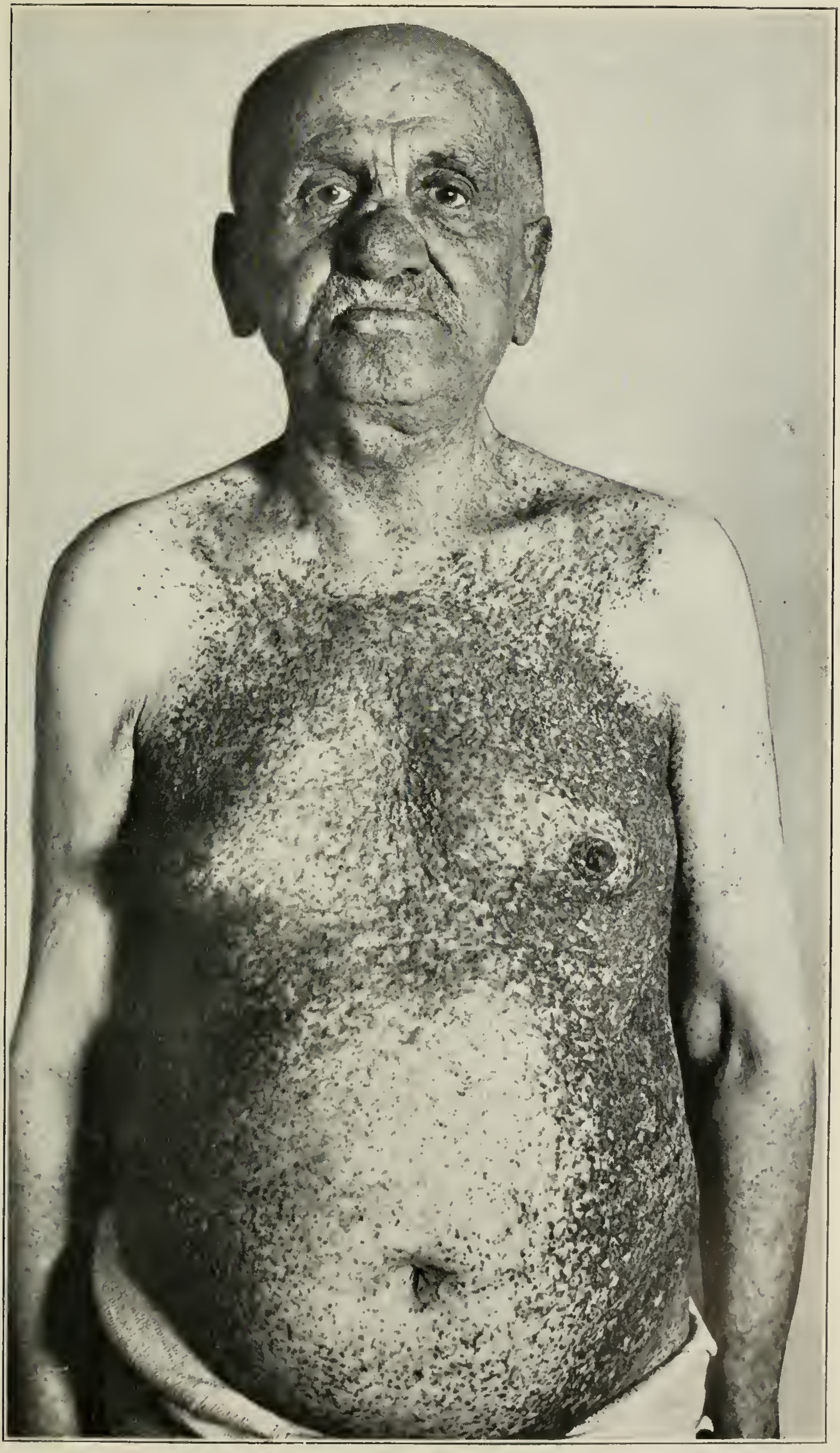
DARIER'S DISEASE.

E. Graham Little, M.D., F.R.C.P.

Wise and Parkhurst[1] give an excellent description of two cases of this very rare affection. The first patient was an old man who had been subject to the disease for fifty-three years, and had been exhibited in countless clinics. When seen by Wise he had, in addition to the extensive follicular affection, a basal-celled epithelioma of the nose (*Plate IX*). The daughter of this patient had had the disease up to the time of her death. The second case, a young woman, age 21, showed a much more scanty eruption of follicular keratosis. but in addition she had a very uncommon concomitant eruption of atrophia maculosa cutis and lineæ atrophicæ in the armpits, and on the neck and shoulders. In the second case **X-ray Applications,** inunction with **Boric Acid Ointment,** and **Thyroid Extract** were given. Under this treatment it is stated that the atrophic lines and patches completely disappeared, leaving a skin apparently normal. The follicular keratosis in some parts

PLATE IX.—DARIER'S DISEASE

(*Psorospermosis follicularis vegetans*)



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also completely vanished, in the armpits "improved 75 per cent". In both patients histological examination and the finding of the typical round bodies established the diagnosis.

REFERENCE.—[1]*Arch. of Dermatol. and Syph.* 1920, Oct., 430.

DEAFNESS.

A. J. M. Wright, M.B., F.R.C.S.

Deaf-mutism.—The etiological classification of deaf-mutes is often difficult. A series of cases has been examined by Young[1] in the hope that the vestibular reactions would assist in this classification. Only cases in which the primary cause of deafness was capable of full identification were selected, and the cases were divided into three classes: (1) Hereditary deaf-mutes, i.e., those with a family history of deaf-mutism, no signs of syphilitic infection, and a healthy middle ear; (2) Deaf-mutism where the affection followed epidemic cerebrospinal meningitis; (3) Syphilitic deaf-mutes, a positive Wassermann reaction and other signs of syphilitic infection being present in each case. In all the true hereditary cases (*Class* 1) the vestibular reactions (rotation and caloric) were normal or nearly so; in all the meningitis cases (*Class* 2) the reactions were entirely absent; while in the syphilitic cases (*Class* 3) the results were variable. Thus it may be said that in a deaf-mute with a functioning vestibule and with no stigmata of syphilis, the presumption is strongly in favour of the hereditary type of deaf-mutism.

Kerr Love[2] insists on the need of a series of post-mortem examinations in undoubtedly deaf-born children. The classification of deaf-mutes for educational purposes and the prevention of deafness are also in need of research. Most deaf-born children have some islands of hearing, while on the other hand many deaf-mutes who have lost their hearing from disease are quite deaf. When, however, the loss has taken place after some speech has been acquired, this speech can be preserved and extended by oral training. The prevention of acquired deaf-mutism depends on the prevention of the infectious disease which is responsible for it. The importance of diagnosing the presence of, and developing, any residual hearing is great. Golstein,[3] dealing with this point, states that 30 per cent of all children found in schools for the deaf have sufficient residual hearing to be of educational value, and the development of this will in some cases transfer them from the group of deaf-mutes to that of hard-of-hearing individuals. Wright[4] emphasizes the imperative duty of the physician to search for such residual hearing in the deaf child at the earliest possible age, and, if found, to encourage the parents and friends to conduct their intercourse with the child in a loud, clear voice at very short distances from his ear. If the parents will talk to the child while facing a big mirror and holding their mouths very near his ear, he can then both see their lips and hear their voices, and so get double help by means of both eye and ear.

Hysterical Deafness.—Mollison[5] has found the monocord a very successful instrument for stimulating the auditory functions in unilateral hysterical deafness. He states that no special powers of persuasion are needed. The method is described as follows: After testing the hearing of the affected ear, the good ear being excluded by means of the noise apparatus, the butt of the monocord is placed on the mastoid, and loud notes are produced in the usual way. The patient hears something; he does not quite know what, and perhaps he really hears with both ears. He is then told he can now hear spoken words, and on testing again he does hear—perhaps at a distance of a foot. A repetition of the monocord notes may be needed, and further improvement results until normal hearing is restored.

A Diagnostic Sign in Progressive Deafness.—Downey[6] has employed Siegle's pneumatic speculum to ascertain the presence or otherwise of permanent vascular changes in the middle ear. The speculum is introduced, and by alternate rarefaction and condensation of the air in the meatus the membrane and ossicles are 'massaged'. If a hyperæmia of the membrane is at once produced, vascular changes are absent, and the case is a favourable one for treatment by inflation and massage. If, on the other hand, hyperæmia is not induced, vascular changes are present, probably in association with a true otosclerosis, and inflation and massage are contra-indicated.

Apparatus.—Shapiro[7] has adapted the Politzer diagnostic tube to two fresh uses. It can be made to replace the elaborate noise apparatus. A small hole is cut near one ear-piece, which is inserted into the patient's ear. The surgeon or patient then blows in the opposite end, and the ear is painlessly deafened while the blowing lasts. On the other hand, the patient can 'massage' his own membrane by placing one end in his ear, the other in his mouth, and alternately puffing out his cheeks and sucking them in.

REFERENCES.—[1]*Jour. of Laryngol. and Otol.* 1921, Nov., 3254; [2]*Ibid.* Jan., 29; [3]*Ibid.* Oct., 482; [4]*Laryngoscope.* 1920, Sept., 597; [5]*Guy's Hosp. Rep.* 1921, April, 206; [6]*Laryngoscope,* 1921, March, 207; [7]*Ibid.* Jan., 32.

DEMENTIA PARALYTICA, HYPOTONIA IN. (*See* STATIC OR POSTURE SYSTEM.)

DEMENTIA PRÆCOX. (*See* MENTAL DISEASE.)

DENGUE.

Sir Leonard Rogers, M.D., F.R.C.P., F.R.S.

C. F. Craig[1] records an interesting résumé of our knowledge regarding the etiology of dengue from the work of Graham in 1903 onwards, which has been recorded in this ANNUAL from time to time, including the demonstration by himself and Ashburn that the blood of cases contains filterable virus, and work showing its transmission by *Stegomyia fasciata*, and possibly by *Culex fatigans*, and he suggests once more that the disease may be caused by a parasite closely resembling that of yellow fever, a theory which requires further investigation. L. Couvy[2] states that during a wide prevalence of dengue in Beyrouth, in Syria, he saw five or six times very scanty spirochætes during the incubation period of the disease one or two hours before the onset of fever, but never during the febrile or convalescent stages of the disease. He describes them as very fine, with two or three spiral turns.

REFERENCES.—[1]*Jour. Amer. Med. Assoc.* 1920, ii, 1172; [2]*Bull. de Soc. Pathol. exotique,* 1921, April, 198.

DENTAL DISEASE AND EYE AFFECTIONS. (*See* EYE AFFECTIONS.)

DERMATITIS, INFECTIOUS ECZEMATOID.

E. Graham Little, M.D., F.R.C.P.

This is a name given to the secondary eczematoid eruptions which commonly develop after parasitic affections or furuncles, or infected traumatic lesions, and Sutton[1] suggests that the process is the result of a sensitization to the infecting organism, which is commonly the yellow or white staphylococcus. The lymphatic glands are often enlarged, the exposed parts are those more commonly affected, there is very little itching; the disease increases by peripheral extension and by auto-inoculation, it occurs in patches, usually not involving a large area, without symmetry, there is much weeping, with subsequent scaling and crusting.

TREATMENT.—In the earlier stages 0·5 per cent aqueous solutions of **Alum. Acetate**, or **Lead and Opium Lotion**, is recommended. Later a 2 per cent **Ammoniated Mercury Ointment** may be smeared on, and dusted with a bland powder containing a small proportion of boric acid. The pruritus, which is sometimes severe, may be treated with **Calamine Lotion** to which 2 per cent to 10 per cent of **Liq. Carbon. Detergens** has been added. Or the mercurial ointment with the addition of 1 per cent carbolic acid or 0·5 per cent menthol may be used in conjunction with the lotion. Internally, **Alkaline Preparations,** such as sodium acetate and sodium citrate in large doses, with the addition of **Sodium Bromide,** are recommended. Finally a mixed staphylococcic **Vaccine** is very useful, given in doses commencing at 25 million, raised gradually, and administered every three days.

REFERENCE.—[1]*Jour. Amer. Med Assoc.* 1920, Oct. 9, 977.

DERMATITIS, RHUS. (*See* RHUS DERMATITIS.)

DIABETES MELLITUS.

John D. Comrie, M.D., F.R.C.P.E.

A series of four articles discussing the experimental investigation of this disease has been published by Allen[1] and co-workers. One of these deals with the alterations of the power to assimilate carbohydrates produced by removal of portions of the pancreas in dogs. It was found, for example, that one animal could assimilate glucose up to the amount of 7 grm. per kilo. of body weight, without any glycosuria ; but that, after removal of the splenic process of the pancreas, glycosuria was produced by 3 grm., and after its uncinate process had also been removed, glycosuria followed the administration of 1·5 grm. per kilo. They conclude that the amount of hormone produced by less than one-eighth of the pancreas is sufficient to prevent diabetes ; and that hopeless diabetes, uncontrollable by fasting, results when the remnant is only one-twentieth. The second article deals with changes in the power to assimilate sugar produced by alterations of the body mass ; and they find that an increased supply of fat or formation of adipose tissue imposes a burden on the pancreatic function, while reduction of any kind of food or of body weight reduces the demand on this function. In the third article an investigation into the effects of exercise is recorded. They trace the influence of exercise on carbohydrate assimilation from the normal through various stages of impairment produced by removal of portions of the pancreas, and find that a rise of blood-sugar ordinarily accompanies exercise in the normal animal, and that the assimilative power is increased. The combustion of food by exercise is preferable to its deposit in the body, but exercise cannot replace dietary restriction or permanently atone for excessive diets. The combustion of calories by exercise loses its power at a stage when dietetic under-nutrition is still effective ; therefore, while heavy exercise is to be deprecated in diabetics, lighter exercise is of great hygienic benefit. The fourth article of the series deals with pancreatic cachexia, a condition which appears to be due to specific endocrine deficiency and is often associated with suppression of glycosuria ; it is definitely shown to be not due to under-nutrition.

In his Goulstonian Lectures, Graham[2] deals with the mechanism that regulates the amount of sugar in the blood and with the various types of diabetes. He considers that the blood-sugar is usually controlled somewhat as follows. The ductless glands play a part, the activity of the thyroid, suprarenals, and pituitary leading to an increase of sugar, while the action of the pancreas opposes this. The need of the muscles, etc., for sugar reacts on a centre in the brain from which impulses pass to the suprarenals by way of the splanchnic nerves ; more adrenalin is formed, and this is believed to act by converting the glycogen of the liver into sugar.

Studies on the renal threshold in 55 Japanese are published by Goto and Kuno.[3] They found that the sugar in the blood was always increased by administering 100 grm. of glucose, and that 33 of the patients showed glycosuria after this amount; the hyperglycæmia reached its height in all cases between forty and sixty minutes after the test, and became normal within three hours. Eight of the patients showed a lowered threshold, but the renal function for the excretion of water, urea, and chlorides in these individuals was quite normal. Three articles on variations in normal blood-sugar, on alimentary hyperglycæmia, and on renal diabetes are published by Strouse.[4] He found that efforts made to change the blood-sugar percentage in normal persons by increased or diminished water intake were unsuccessful, but that variations occur naturally from day to day, depending apparently on the weather. He describes four cases of renal glycosuria that have been under his observation from two to eight years, and that show no symptoms of diabetes, despite the fact that they constantly excreted sugar after a test meal. Other observations on the blood-sugar have been made by Pickering;[5] he finds that the blood-sugar is raised in proportion to the clinical severity of diabetic cases, but that the amount of reduction of which it is capable by treatment is of more importance than its height; in other words, a case with high blood-sugar which is reduced by restriction of carbohydrates will probably improve more than a case with lower blood-sugar which is not influenced by diet. Graham[2] considers that the raising of the renal threshold or leak-point for sugar is a defensive mechanism, and that cases of increased tolerance for carbohydrates are often due to a raising of the leak-point, not to increased storage power of the tissues for glucose.

The relation of hyperthyroidism to diabetes is discussed by Fitz[6] in connection with several cases. He considers that there is no evidence for more than a chance connection between the two, and that the improvement in both the thyroid symptoms and the diabetes which often follows removal of part of the gland is due to a change in the rate of metabolism.

A classification of diabetic cases, based upon the difference value of the blood and iodine co-efficient of the urine, is attempted by Cammidge.[7] He believes that about 33 per cent are of pancreatic origin, others are of hepatic origin, some due to a combination of liver and pancreas deficiency, while a number are the expression of some error in the nervous system or in the thyroid gland.

The essential features of the rare disease of bronze diabetes are stated by Koettlitz[8] to be a diminution of the power in the cells of the body generally to utilize carbohydrates, and an abnormal power to fix the hæmoglobin of the blood, along with a general tendency to fibrosis.

The relation of trauma to diabetes in certain cases is discussed by Diez,[9] who, from the results collected by various authors, concludes that trauma of the head, spine, etc., is the exciting cause in from 2 to 10 per cent of diabetics.

It is suggested by Higginson,[10] with regard to the generally recognized connection between glycosuria and boils or other forms of sapræmia, that in some cases the sapræmic condition is the primary one and the cause of glycosuria.

The fat metabolism in diabetes was investigated by Blau and Nicholson,[11] who found that as the blood-sugar fell under treatment there was a marked increase in blood lipoids. The diabetic organism can utilize fats more readily in the presence of large amounts of sugar in the body, so that in 'sugar-free' patients there must be a great difficulty in burning up fats when large amounts of fat are fed.

Seven cases of pentosuria are described by Cammidge and Howard,[12] who are inclined to consider this abnormality to be dependent on defects in the functional activity of the liver, in some cases resulting from failure to metabolize a pentose of protein origin, while in others there is merely an alimentary pentosuria caused by inability to destroy pentose derived from the food.

The significance of small amounts of glucose in the urine is discussed by

Kast, Wardell, and Myers,[13] who show that the testing of a single specimen of urine may give fallacious results of the patient's tolerance. Since small amounts may come and go in two or three hours after a meal, it is important to take for testing a sample of the 24-hours collected urine.

The 'hæmoclasic crisis' is the name given by Widal, Abrami, and Jancovesco[14] to a leucopenia appearing in diabetics after ingestion of glucose from 20 to 100 grm. in amount. It occurs almost invariably, commencing twenty minutes after the sugar has been taken ; and at its height, in an hour or more, the number of leucocytes may be reduced to one-half their previous count. This occurs only in cases of true diabetes, and is suggested by the authors as one means of differentiating between glycosuria of true diabetes and that of merely alimentary origin.

The retinitis of diabetes mellitus was studied by Wagner and Wilder[15] in 300 cases, and they come to the conclusion that retinitis does not occur in uncomplicated cases of diabetes ; cases in which it is found also show evidence of vascular or renal disease ; retinitis occurred in 23 out of these 300 cases.

The occasional occurrence of angina pectoris as a troublesome complication of diabetes is noted by Kahn,[16] who recommends the use of **Bromides** and **Codeina** sedatives.

TREATMENT.—In view of the fact that the death-rate from diabetes in England and Wales has risen steadily in recent years—from 59 per million living in 1886, to 97 in 1906, and to 130 in 1916—Williamson[17] suggests that prevention has become a matter of increasing importance. Apart from race, family, and other conditions which cannot be altered, he considers that the predisposing causes are mental overwork, the eating of too much sugar in sweet foods and drinks, and the development of stoutness along with deficient exercise. He considers that starchy foods do not cause diabetes, and that sugar is more injurious than starch in increasing glycosuria. He advises that sugar and sweet foods generally should be taken in moderation, especially by those who on the grounds of family history or otherwise may be supposed to be especially liable to the disease. If difficulty is experienced in limiting the amount of food, then bulk should be made up by stuffs with a large residue like **Green Vegetables** and **Jelly.** If sugar has appeared in the urine occasionally, the sugar tolerance test should be carried out by administering 100 grm. of glucose in a cup of tea taken in the morning ; the diet is to be regulated according to the result. For mild cases of glycosuria this writer recommends the **Egg and Cream Diet** (*see* MEDICAL ANNUAL, 1921, p. 149). The danger of keeping patients long on too low a diet has been frequently pointed out, e.g. by Richter,[18] who agrees with von Noorden in recommending that the permanent diet of a diabetic must contain 35 calories per kilo. of body weight.

The danger of an excessive proportion of fat in the diet of the diabetic is discussed by Cammidge,[19] who states that, while a healthy person requires only about one part of sugar for the complete combustion of three parts of fat, in the diabetic one part of sugar will only burn off one and a half times or twice its weight of fat. He believes that if this proportion between the two kinds of food-stuff be exceeded in the direction of fat, acetone bodies are apt to be formed, the functional capacity of the liver deteriorates, and coma eventually supervenes. On the other hand, Newburgh and Marsh,[20] in a series of careful observations carried out on 73 cases of diabetes, have shown that it is possible, without acidosis and without loss of weight or vitality, to keep patients for long periods on a high fat, low protein, and low carbohydrate diet, containing, for example, 140 grm. fat, 10 grm. protein, and only 20 grm. carbohydrate, and supplying 1400 calories. They conclude that patients with severe diabetes, as a class, do not remain sugar-free on the usual high-protein diet unless the total energy intake is kept so low that incapacity from starvation results ; on the other hand, the high-fat diet, as they found in their 73 cases, will keep the patient sugar-free, prevent the occurrence of severe acidosis, maintain his nitrogen balance, and enable him to resume the ordinary activities of life. It would appear from their researches that the common fear of fat in a diabetic diet as productive of acidosis is fallacious.

An **Occasional Fruit Day** to supply extra carbohydrate is recommended by von Noorden,[21] say once in the week, followed by a **Vegetable Day.** By this means the waste of body protein is minimized. In severe cases **Oatmeal Diet Days** should also be included in the patient's régime. Occasional carbohydrate days are also recommended by Salomon.[22]

A dietetic method, in which protein is kept at a constant level and the other constituents are gradually lowered, is outlined by Feulon,[23] with the results obtained in 40 cases. A standard diet is given at the commencement of the period of treatment, and the fat and carbohydrate in this are gradually diminished instead of the method of complete starvation. The amounts allowed are 70 to 80 grm. of protein for an adult, 130 to 140 grm. of carbohydrate, and at first no fat. The protein is maintained at this level throughout, but the carbohydrate is brought down by 10 or 15 grm. daily till the urine is sugar-free. If the patient reaches the stage at which only 10 grm. of carbohydrate are given daily without the urine becoming free from sugar, the course of carbohydrate reduction is started again with one-third less of protein, this amount now remaining constant throughout. The writer states that good results were obtained by this method.

A slight modification of the fasting treatment is suggested by Mason[24] as the result of treating 150 cases by its means. The patient is put on a general observation diet for three days ; then this diet is halved, and on the next day one-quarter only is given ; on the next day again the patient fasts, except for washed vegetables, cakes of crushed bran, and chicken broth. After the urine has thus been made sugar-free, the tolerance to carbohydrates is discovered by gradually building up the diet, and on discharge from hospital the patient is provided with instructions as to the diet he can tolerate, and an outfit for testing his urine daily.

An equivalent diabetic dietary is presented in a very convenient form by Ewing.[25] A short extract from it is given on the opposite page. From this it is an easy matter for the patient or nurse to work out sufficient variety, and weigh the correct amount, when he is given such a prescription as protein 65 grm., fat 150 grm., and carbohydrate 35 grm. Cornwall[26] gives a similar diet table in which the grammes of each constituent are detailed in a standard portion of 30 grm. for about one hundred articles of diet.

An elaborate series of analyses of over 600 diabetic foods has been prepared by the Connecticut Agricultural Experiment Station,[27] dealing to a large extent with novelties of present-day diabetic dietary and cookery. This is obviously of great practical value in determining the amounts of such foods that may be taken by diabetic patients, especially in view of the fact that most of them are found to contain far more carbohydrate than is usually supposed.

The value of **Cocoanut** for diabetics, either in the form of cocoanut oil used for cooking or of finely powdered nut included in cakes, is strongly urged by Basu.[28] The same writer points out that **Honey,** which in the pure state consists of lævulose, is a good substitute for other sweet-stuffs and is not harmful in diabetes. A successful case of treating diabetes by **Novarsenobenzol** is described by Porter,[29] who also refers to several other cases. In this case the patient received five doses of the drug in addition to dieting himself with some care; the sugar speedily disappeared from the urine, and six months later was still absent. Curatolo[30] reports two cases of diabetes which showed great diminution of glycosuria under the administration of **Lactate of Sodium** in doses of 5 gr. rising to 60 gr. daily. Dresel[31] mentions the value of **X-Ray Radiations** applied to the back over the suprarenal region in diminishing the amount of sugar in the blood and urine, and cites three illustrative cases. Schild[32] mentions that he has had good results in diminishing the glycosuria in diabetics by the injection of **Pituglandol**. Grafe[33] prefers the preparation **Caramose** to home-made production of caramel, which has been mentioned (MEDICAL ANNUAL, 1921, p. 149) as a useful food in diabetes. Caramel can be administered without injury in cases of moderate severity to the extent of 50 or 100 grm. daily; and it may be given in wine or brandy. In two cases he had seen the sugar in the urine reduced to $\frac{1}{4}$ or $\frac{1}{10}$ of its previous amount when the cereals given as food were caramelized.

Description	Weight of portion	Protein	Fat	Carbo-hydrate
	grm.	grm.	grm.	grm.
A. *Protein Equivalents* (6 *grm. each*):—				
Lean meat, or poultry, cooked ..	22	6	3	0
Fish, lean	30	6	0	0
Oysters, six average	—	6	1	3
Ham, boiled	30	6	7	0
Egg, one	60	6	6	0
Cheese, American	20	6	7	0
Milk, three-fifths glass	150	6	6	7
Almonds	30	6	18	5
B. *Carbohydrate Equivalents* (5 *grm. each*):				
Asparagus, cabbage, celery, cauliflower, grape-fruit, lettuce, tomato	150	2	0	5
Orange, pineapple, strawberries ..	75	0	0	5
Oatmeal, dry	8	1	0	5
Bread	9	1	0	5
Cream, 40 per cent	150	5	60	5

From the above figures the calories afforded may, if desired, be calculated by multiplying the number of grammes by 4 for protein, 9 for fat, and 4 for carbohydrate.

With regard to *operations in diabetic patients*, surgical interference is much more readily undertaken than it was formerly. Berkman[34] states that in the Mayo Clinic 159 operations of all sorts have been performed on diabetics, with a mortality of 5·03 per cent; that occurring in patients with already infected tissues being twice as great as in aseptic cases. Kahn[35] discusses the pre-operative preparation of diabetic patients, which includes keeping the bowels open, the liberal administration of fluids, increase of tolerance for carbohydrates, avoidance of acid-producing substances such as fats, administration of ketone-consuming substances such as oatmeal, lævulose, alcohol, and avoidance of alkalis. He considers that nitrous oxide is the anæsthetic to be preferred, even to local anæsthetics.

The treatment of diabetic *acidosis* is discussed by Edgar,[36] who considers that ketonuria is often set up by the institution of starvation, which produces incomplete oxidation of body tissues to supply the place of food. When called to see such a patient he administers 1 grm. of carbohydrate per kilo. of body weight either in the form of **Orange-juice** or of **Oatmeal Gruel**. If the patient is semi-comatose he introduces into the colon 6 to 8 oz. of saline solution containing glucose 5 per cent and bicarbonate of soda 2 per cent. Also he makes the patient drink some 3000 c.c. of fluid every twenty-four hours.

References.—[1]*Amer. Jour. Med. Sci.* 1920, Dec., 781, 1921, Jan., 16, Feb., 165, and March, 350 ; [2]*Lancet*, 1921, i, 951 ; [3]*Arch. of Internal Med.* 1921, Feb., 224 ; [4]*Ibid.* 1920, Dec., 751 ; [5]*Quart. Jour. Med.* 1920, Oct., 19 ; [6]*Arch. of Internal Med.* 1921, March, 305 ; [7]*Lancet*, 1921, i, 274 ; [8]*Arch. méd. Belges.* 1920, June, 494 ; [9]*Policlinico*, 1921, March, 43 ; [10]*Brit. Med. Jour.* 1921, i, 296 ; [11]*Arch. of Internal Med.* 1920, Dec., 738 ; [12]*Brit. Med. Jour.* 1920, ii, 777 ; [13]*Amer. Jour. Med. Sci.* 1920, Dec., 877 ; [14]*Presse méd.* 1921, Feb., 121 ; [15]*Jour. Amer. Med. Assoc.* 1921, Feb., 515 ; [16]*Ibid.* 570 ; [17]*Practitioner*, 1920, Oct., 233 ; [18]*Jour. Amer. Med. Assoc.* 1921, Feb., 624 ; [19]*Practitioner*, 1920, Oct. ; [20]*Arch. of Internal Med.* 1920, Dec., 647, and 1921, June, 699 ; [21]*Münch. med. Woch.* 1921, May, 651 ; [22]*Wien. klin. Woch.* 1921, April, 185 ; [23]*Amer. Jour. Med. Sci*, 1921, Feb., 193 ; [24]*Jour. Amer. Med. Assoc.* 1921, Jan., 203 (abstr. from *Canad. Med. Assoc. Jour.* 1920, Dec., 1105) ; [25]*Ibid.* 300 ; [26]*Ibid.* 1920, Dec., 1642 ; [27]*Ibid.* Sept., 818 ; [28]*Diabetes Mellitus and its Dietetic Treatment*, pp. 50 and 70 ; [29]*Lancet*, 1920, ii, 1051 ; [30]*Policlinico*, 1920, Dec., 1482 ; [31]*Jour. Amer. Med. Assoc.* 1921, March, 760 (abstr. from *Deut. med. Woch.* 1920, Nov., 1240) ; [32]*Münch. med. Woch.* 1921, May, 653 ; [33]*Ibid.* 652 ; [34]*Minnesota Med.* 1921, Jan., 4 ; [35]*Surg. Gynecol. and Obst.* 1920, Oct., 363 ; [36]*Med. Record*, 1921, June, 952.

DIATHERMY. (*See* Electrotherapeutics.)

DIPHTHERIA.

J. D. Rolleston, M.D.

Etiology.—W. G. Savage[1] discusses the evidence connecting cats with human diphtheria, and records the results of his own investigations, which were conducted as follows : (1) Bacteriological examination of the nose and throat of healthy cats not associated with any cases of human diphtheria ; (2) Bacteriological and pathological examination of cats associated with human diphtheria ; (3) Experimental investigation of kittens. Examination of the nose and throat of eight healthy cats and twelve kittens showed that none of the kittens had any organisms resembling diphtheria bacilli, while in five of the eight cats organisms more or less closely resembling Klebs-Löffler bacilli were found, but with one possible exception were definitely not diphtheria bacilli. Examination of the five cats associated with human cases showed no anatomical lesions resembling diphtheria, and no definite diphtheria bacilli could be isolated. Experiments on young kittens were exceptionally uniform and concordant, it being found impossible to infect them by throat swabbing, though very massive doses were invariably used. Savage concludes that the common view that cats can suffer from human diphtheria is entirely unfounded, and is based on an insufficient examination and differentiation of the bacilli, due to a failure to realize that a large proportion of normal cats contain in their throats organisms which closely resemble true diphtheria bacilli. On the other hand, J. S. Simmons[2] reports the following cases, which prove that cats may be carriers of virulent diphtheria bacilli and therefore be a danger to human beings. An elderly lady developed a fatal attack of faucial diphtheria after fondling a cat which had been ill one week before her illness began. The cat was said to have had a croupy cough, to have been unable to swallow food, and to have become very thin. Throat cultures from the cat and from the patient showed morphologically similar organisms, and their virulence for guinea-pigs was the same. The cat was killed, and the autopsy revealed a small ulcer covered with a yellowish membrane on the upper surface of the left nasal fossa, cultures from which yielded diphtheria bacilli. A second cat, which had played with the first and yielded a throat culture showing typical diphtheria bacilli, died after eight days' confinement in a cage, and post mortem showed small membranous patches on the vocal cords from which diphtheria bacilli were grown.

BACTERIOLOGY.—A. J. Eagleton and E. M. Baxter[3] have devised an *intracutaneous test* for determining the virulence of diphtheria-like organisms. It yields the same results as the subcutaneous test, but is more economical, as the experimental animals survive. Two guinea-pigs are chosen for each test. One, which acts as a control, is given 500 units of antitoxin by intraperitoneal injection on the day preceding the test. The test strains and a known virulent diphtheria bacillus are grown eighteen hours on Löffler slopes, emulsified in saline, diluted, and standardized by opacity so that the suspension contains approximately 50 million organisms per c.c.; 0·2 c.c. of each suspension is injected intradermally, and at least 1 in. apart, into white-haired portions of the guinea-pigs which have been depilated by calcium sulphide paste. Four or five hours later the animal which was not given a protecting dose receives 125 units of antitoxin intraperitoneally. Readings are taken for the next three days. In the case of a virulent diphtheria bacillus the control animal shows nothing, or a faint transient blush, while the other animal shows a definite rose-red swelling which becomes more marked and may end in slight necrosis. An avirulent diphtheria-like organism gives a negative result with both animals.

J. Gelien, W. L. Moss, and C. G. Guthrie,[4] as the results of experiments on cats, rabbits, and guinea-pigs, found that production of nasal infection was quite inconstant, even when the organisms were introduced directly into the nose. A somewhat higher percentage of animals (66 per cent) showed positive cultures among those directly inoculated than among those merely exposed to a carrier (55 per cent). Cats and rabbits became infected with about the same frequency (cats 48 per cent, rabbits 50 per cent). Among the guinea-pigs 66 per cent developed positive cultures. The duration of infection was usually quite short, but some animals still harboured diphtheria bacilli at the end of the experiments. The health of the animals was apparently unaffected by the mere presence of the bacilli in the nose. The occurrence and duration of the infection were independent of the strain of the organisms used for inoculation, and were wholly unaffected by the previous administration of antitoxin.

The same writers[5] made observations on school-children, with the following results: The diphtheria bacilli present in a majority of healthy carriers were avirulent. Out of 135 positive cultures obtained from 50 children, virulence tests were performed in 110, and only 12, or 10·90 per cent, were found virulent. The writers point out that avirulent bacilli cannot produce diphtheria, and that there is no proof that avirulent diphtheria bacilli can acquire virulence. The carrier of virulent bacilli therefore occupies quite a different position from that of the carrier of avirulent bacilli.

G. H. Weaver[6] states that from 1913 to 1920, 52 patients were admitted to the Durand Hospital, Chicago, as carriers, and were kept under observation until free from bacilli without operation. Of these, 55·8 per cent were free from bacilli after two weeks, and 80·8 per cent after four weeks. In 10 of the 52 cases the bacilli persisted longer than four weeks. In 4 of these the cultures were obtained from the pharynx only, in 1 from the nose alone, and in 4 from the pharynx and nose. The persistent pharyngeal cultures were associated with abnormal tonsils, usually enlarged, with deep crypts and roughened surfaces. In the nasal cases there were discharges associated with adenoids and chronic rhinitis usually secondary to accessory sinus disease.

SYMPTOMS.—During the last six years U. Friedemann[7] has seen ten cases of *chronic diphtheria*, the term 'chronic' being applied to cases in which the membrane remained unchanged after a fortnight. In two cases the membrane had persisted for over fifteen and eighteen months respectively. In all the cases the causal connection between syphilis and chronic diphtheria was proved by a positive Wassermann reaction and the prompt effect of antisyphilitic treatment.

According to Lambert,[8] *primary diphtheria of the middle ear* occurs in both sexes and in adults as well as in children, though like all forms of diphtheria it is commonest in early life. Infection takes place from the pharynx or nasal fossæ by the Eustachian tube. The condition is characterized by the association of the following symptoms: intense and persistent pain, pronounced bulging of the tympanic membrane, and a sero-hæmorrhagic discharge sometimes containing pieces of membrane. If recognized in time and treated with antitoxin, it rapidly clears up; otherwise it tends to become chronic and to be complicated by mastoiditis or facial paralysis.

G. Cochrane[9] reports a case of *primary diphtheria of the penis* in a boy, age 3½ years, without any infection of the throat or nose, followed by paralysis of the palate and pharynx, and squint. Recovery took place.

According to Poulard,[10] *paralysis of accommodation*, which occurs from three to four weeks after the sore throat, affects myopic subjects least because they have no need to accommodate for near vision. Hypermetropic subjects suffer most, because they have to accommodate more than persons with normal vision for near objects, and have also a greater or less degree of disturbance of distant vision according to the degree of hypermetropia. Presbyopic subjects are little affected, because they have become progressively accustomed to dispensing with accommodation. Unlike the paralysis which occurs in syphilis, diphtheritic paralysis of accommodation is bilateral, and appears simultaneously in both eyes. It is exclusively confined to accommodation and does not affect the iris, the pupils reacting both to light and accommodation. The condition clears up spontaneously, and injection of antitoxin recommended by some writers is unnecessary. While the paralysis lasts, the patients may be given glasses to correct the visual defect.

From a study of the literature and observation of six cases of diphtheritic paralysis in which *examination of the cerebrospinal fluid* was made, De Lavergne[11] concludes: (1) Diphtheritic paralysis, whether confined to the soft palate or generalized, is accompanied as a rule by a meningeal reaction; (2) The reaction consists in an excess of glucose and albumin in the cerebrospinal fluid associated with a normal lymphocytosis; (3) The reaction is probably present a little before the appearance of the paralysis. The excess of glucose in the cerebrospinal fluid is the first sign, and persists until clinical recovery.

Prophylaxis.—Gladys Ward[12] employed the **Schick Test** in 150 children suffering from various diseases, 150 scarlet-fever patients, and 50 maternity cases. She found that the greatest number of positive reactions occurred in children between the ages of six months and five years. The proportion of positive reactions was higher among scarlet-fever patients (56 per cent) than in general diseases (37 per cent); but the number of positive reactions in acute cases, such as pneumonia, acute bronchitis, acute gastro-enteritis, etc., was as high as in the scarlet-fever cases. In the maternity cases, 90 per cent of the mothers and 96 per cent of the babies gave a negative reaction. Ward regards the test as of great value in deciding whether a patient is a carrier or is really suffering from diphtheria. Thus a negative reaction in a case of tonsillitis or nasal discharge containing diphtheria bacilli would indicate that a patient was merely a carrier and not suffering from real diphtheria. The test is of still greater value in showing what persons exposed to infection may be spared injection with antitoxin, thus minimizing the risk of anaphylaxis and also saving pain and expense. Ward recommends that only those nurses who give a negative Schick test should be employed in the diphtheria wards of a hospital.

TREATMENT.—E. C. Aviragnet, P. Lereboullet, and P. L. Marie[13] condemn the *administration of diphtheria antitoxin by mouth* recently advocated by L. Dufour. Precious time is wasted, especially in severe forms of diphtheria which can only be controlled by an early and intensive treatment consisting in intramuscular injection accompanied or followed by subcutaneous injection (*see* MEDICAL ANNUAL, 1921, p. 153). They allude to the experimental work of Hewlett, who was unable to find the least trace of antitoxin in the serum of rabbits or guinea-pigs when it had been given by the mouth or rectum. The present writers have employed another method to prove the inefficacy of antitoxin when given by the digestive tract. Children with a positive Schick reaction were given by mouth 20 c.c. of antitoxin containing 250 units per c.c. in the course of one to three days, and then tested again. Contrary to what occurs after subcutaneous injection, in none of the cases did the ingestion of antitoxin have the least effect on the intensity of the reaction. Intrarectal injection of antitoxin also had no effect upon a positive Schick reaction.

In a review of 515 cases of laryngeal diphtheria in which **Intubation** was performed during the period 1918–20 at the Chicago Municipal Contagious Diseases Hospital, A. L. Hoyne[14] states that a considerable reduction in mortality—15·6 per cent for 205 cases in 1920, as compared with 50·4 per cent for 121 patients in 1918 and 32·32 per cent for 189 patients in 1919—was attributable to the following factors: (1) Permanence of resident physicians; (2) Specially trained nurses, one of whom always has the patients under constant supervision; (3) Emergency-bell system; (4) An interval of four or five days before the tube is removed, thereby reducing the number of re-intubations necessary; (5) Thorough sterilization of instruments, thus lessening to some degree at least the frequency of bronchopneumonia; (6) Thorough cleansing of hands before and after each operation; (7) Transfer of patients from the tube room as soon as this can be done with safety, thus lessening the chance of cross-infection.

Treatment of Carriers.—G. Weaver[6] states that between June, 1915, and December 31, 1920, 40 diphtheria carriers at the Durand Hospital, in whom local washes had failed to remove the bacilli, were operated on. In all cases the tonsils were enucleated, and in 5 adenoids were also removed. After operation the bacilli usually disappeared very promptly.

G. A. Gray and B. I. Meyer[15] found that **Mercurochrome** (a bisodium salt of dibrom-oxymercury-fluorescein), dropped into the noses and painted on the tonsils in 1·2 per cent solution, freed 88 out of 90 carriers from *B. diphtheriæ* after an average of nineteen applications in an average of twelve days. The criterion of cure was three consecutive negative cultures taken at two-day intervals, but while treatment was still applied. The third negative swab was taken twenty-four hours after the last treatment.

REFERENCES.—[1]*Jour. of Hygiene*. 1920, 448; [2]*Amer. Jour. Med. Sci.* 1920, ii. 589; [3]*Brit. Med. Jour.* 1921, i, 775; [4]*Johns Hop. Hosp. Bull.* 1920, 381; [5]*Ibid.* 388, [6]*Jour. Amer. Med. Assoc.* 1921, i, 831; [7]*Berl. klin. Woch.* 1921, 376; [8]*Med. Science*, 1921, iv, 19; [9]*Brit. Jour. Child Dis.* 1921, 86; [10]*Paris méd.* 1921, ii. 57; [11]*Med. Science*, 1921, iv, 24; [12]*Brit. Med. Jour.* 1921, i, 928; [13]*Bull. et mém. Soc. méd. Hôp. de Paris*, 1921, 1160: [14]*Jour. Amer. Med. Assoc.* 1921, i, 1305; [15]*Med. Science*, 1921, iv. 454.

DISLOCATIONS. (*See* ORTHOPÆDIC SURGERY.)

DRUG ERUPTIONS.

E. Graham Little, M.D., F.R.C.P.

Arsphenamine (*arsenobenzol*).—Latham,[1] quoted by Bowen, describes four cases of exfoliative dermatitis following upon intravenous injection of arsphenamine, one ending fatally.

In his summary of the latter, the writer emphasizes the fact that diarrhœa and vomiting were absent during all stages of the intoxication ; that nephritis was not marked at any time and appeared only at the end ; that there was a decided affinity of the poison for the skin and for the trophic nerves supplying it ; that arsenic was persistently present in the urine, without accompanying renal irritation, and was found at the autopsy in every tissue in which it was sought for ; and that there was a high leucocytosis and eosinophilia, the latter corresponding closely to the patient's condition.

Beeson reports a case in which exfoliative dermatitis was associated with polyneuritis, and comments on the similarity of these symptoms to those reported by Brooke and Roberts in the epidemic of arsenical poisoning from beer in England in 1901.

Reference.—[1]*Boston Med. and Surg. Jour.* 1921, April 7, 360.

DUODENAL ANALYSIS.

O. C. Gruner, M.D.

Duodenal analysis is employed for the purpose of assessing the functional state of the bile-passages. The samples are obtained by means of a special duodenal catheter (Lyle, Einhorn). In 1920, Lyle asserted that samples of bile could be obtained in this way from the common duct, from the gall-bladder, and from the intrahepatic ducts in succession, by introducing magnesium sulphate into the duodenum first. Einhorn[1] considers that it is not the magnesium which excites the relaxation of the biliary sphincter and betrays this action through changes of colour in the successive fractions procured, for other salts produce the same changes. Hence it must be the sulphate part that is concerned. If the sulphate is given a second time during the same experiment, exactly the same sequence of colour appears as on the first occasion. Since all these passages cannot have refilled and re-emptied in the time, it follows that the colour-changes are not an index of states in particular parts of the biliary system.

Einhorn found that the change of colour was not as marked in some persons as in others, and explains this as being an expression of variations in the functional activity of the liver. Biaggi[2] describes certain colour variations in association with certain diseases : The bile is clear yellow in cholecystitis without stones, and in cholecystitis with complete obstruction of the cystic duct ; it is turbid in chronic hæmolytic icterus ; it is dark green, turbid, and admixed with blood in hydatid cyst. [Admixture with blood is frequent in acute cholecystitis.—O. C. G.] It is rich in urobilinogen in pernicious anæmia, not in secondary anæmias. Einhorn found that the bile never becomes brown after the instillation of magnesium sulphate in a case of pronounced hypertrophic cirrhosis with ascites, and other cases confirmed his view that here we have a guide to the state of hepatic function.

Biaggi[2] discusses the utility of duodenal catheterization both for diagnosis and treatment. Duodenal alimentation can be carried out, provided a thin enough nutrient fluid be employed, so that the fine apertures will not become blocked. Irrigation with medicaments such as protargol, argyrol, ichthyol can be performed in cases of duodenitis and chronic cholecystitis. Einhorn also advocates introducing certain salts therapeutically.

Technique.—The passage of the Einhorn tube into the duodenum presents certain difficulties. Moppert[3] does not go by the measurements usually specified, pointing out that a tube passes quickly or slowly into the duodenum according to the motor power of the stomach. In an atonic stomach the tube may easily be passed full length without entering the duodenum at all. Therefore it is necessary to have *x*-ray confirmation as to the position of the end of the tube. In cases of ulcer or cancer of the pyloric region, the tube will not go through the pylorus at all. Even the withdrawal of a bile-stained sample is not proof that the end of the tube is in the desired place.

Humbert[4] does not appear to find any difficulty with the Einhorn tube beyond the initial stages. He overcomes the difficulty by obtaining the patient's intelligent co-operation.

Palefski[5] combines the use of the tube with *x*-ray examination. Samples of duodenal fluid are removed for analysis, and then barium is injected and photographs are taken. He uses a specially heavy bulb, which is introduced into the empty stomach in the sitting posture as far as the 15-in. mark, and then, with the patient on the right side, up to the 20-in. mark. Then, making sure that it is in proper position, the patient is directed to lie down for three hours, with the foot of the bed raised nine inches. The tube gradually goes down to 30 in., and is then in the duodenum. In about 9 per cent of his cases the tube fails to pass further than the first part of the duodenum; this is always indicative of spasm of the pylorus.

CHEMICAL ANALYSIS.—Biaggi[2] gives a good résumé of this subject. Samples obtained by the duodenal catheter are (1) titrated for degree of alkalinity, (2) examined for ferments by exposing tubes of starch, of oleic acid, and of hæmoglobin to the juice, (3) examined for blood and other pathological admixture.

FINDINGS IN VARIOUS DISEASES.

1. *Duodenal Ulcer.*—Here there is a high acidity of the stomach contents in over 80 per cent (Palefski), blood in the duodenal contents in 83 per cent. The *x* rays, and the position of the bulb in the duodenum as seen by *x* ray, are additional guides.

2. *Chronic Gall-bladder Disease.*—Here there are periduodenal and peripyloric adhesions, which are the sign of gall-bladder infection. The duodenal curve, observed by *x* ray, is distorted in 75 per cent. The signs of duodenal ulcer are found in 18 per cent. Adhesions were found by *x* rays in 15 per cent. Occult blood was found in 8·6 per cent (Palefski[5]).

3. *Diseases other than Gall-bladder Disease.*—A number of other disorders simulate gall-bladder disease, but the absence of blood, or of distortion of the position of the duodenum, helps to prevent mistakes of diagnosis.

EXPERIMENTAL WORK PERFORMED BY MEANS OF THE DUODENAL TUBE.—The papers referred to above make it clear that much better understanding of the physiology of this part of the digestive tract has been gained through direct experiment. The work of Bennett and Venables,[6] Dauwe,[7] Moppert,[3] McKinlay,[8] as well as Einhorn's work, illustrate the directions in which researches can be carried out to improve our knowledge about digestion. Ryle[9] and his co-workers have studied the effects of various articles of diet upon the secretion of hydrochloric acid, partly from academic reasons, and partly to settle whether certain dietaries customary in gastric diseases are logically correct. Similar work is being carried on in regard to the duodenum.

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DUODENAL ULCER. (*See* GASTRIC AND DUODENAL ULCER; *and* STOMACH, SURGERY OF.)

DYSENTERY, BACILLARY. (*See also* AMŒBIASIS; BALANTIDIOSIS.)

Sir Leonard Rogers, M.D., F.R.C.P., F.R.S.

ETIOLOGY.—Keersmakers[1] has studied dysentery cases in Brussels, Belgium having been infected during the war. The agglutination test showed the cases to be of the Flexner type, which was obtained in 75 out of 170 cases with symptoms of dysentery or diarrhœa. S. W. Patterson and F. E. Williams[2] have studied summer epidemic diarrhœa in Melbourne, and found Flexner dysentery bacilli in two-thirds of cases with blood and mucus in their stools, and in one-third of those with only pus cells or old mucopus indicating a subacute or chronic colitis, but in only 3 per cent of those without mucus or pus. It is important to recognize the infectiousness of these cases, and to take proper precautions against it. H. R. Drew and N. H. Fairley[3] record a useful brief description of bacillary and amœbic dysentery.

Prophylaxis.—H. Vincent[4] has used a polyvalent dysentery **Vaccine** sterilized by ether, in an epidemic, which ceased in a few days.

Treatment.—J. Danysz[5] has used a **Non-specific Antigen** in a dysentery epidemic in Pologne, M. Jezierski reporting the loss of only 1 case in 40 under this treatment, although the previous case mortality was 26 per cent. Non-dysenteric organisms isolated from the bowel were sterilized by heat and injected or ingested.

References.—[1]*Arch. méd. Belges*, 1921, Jan. 1; [2]*Med. Jour. of Australia*, 1921, June 4, 460; [3]*Ibid.* 453; [4]*Jour. of State Med.* 1921, 54; [5]*Presse méd.* 1921, May 7, 362.

DYSIDROSIS.

E. Graham Little, M.D., F.R.C.P.

Bowen[1] quotes Darier as stating that as a result of his experience of war work in France he has formed the conclusion that the entity described as dysidrosis and cheiropompholyx does not exist, and that the clinical conditions so named are always of mycotic causation.

Reference.—[1]*Boston Med. and Surg. Jour.* 1921, April 7, 358.

DYSPEPTIC DISORDERS IN INFANTS AND YOUNG CHILDREN.

Frederick Langmead, M.D., F.R.C.P.

H. C. Cameron[1] holds that the special liability of the young child to gastro-intestinal disturbances depends not only upon his high demand for food and the strain thereby imposed upon digestion, but also upon a low immunity against catarrhal infections, and a highly sensitive and uncontrolled nervous system. Writing of *parenteral* (*non-intestinal*) *infection*, he takes the side of the school which believes that infective conditions which cause diarrhœa and vomiting in infants are comparatively seldom intestinal and much more often parenteral. In the treatment of such cases the mother must be made to understand that the diarrhœa and vomiting are not due to unsuitable food, and will only cease with the cessation of the infection. It is usually sufficient to cut down the amount of food by a third or a quarter and to make up the quantity by dilution with water, or it may be well to omit added cream or remove some from the milk by skimming.

Primary errors of digestion may be produced by overfeeding, especially by excess of fat or sugar, but often are dependent upon an individual idiosyncrasy —a relatively low power of certain children to deal with sugar, or starch, or fat. Of the several forms of primary dyspepsia, he considers only one in detail—that commonly met with in constipated children, whose stools are hard, formed, and pale, and often putty-like. The infants are generally fed upon an artificial mixture in which cow's milk predominates, especially if there be a high protein and fat content and a relatively low percentage of fermentable sugar. The disturbance is apt to occur in infants convalescing from severe infections, and after fermentative dyspepsia with acid-green stools, such as is met with in times of great heat. The stools consist largely of soaps, and bacteriologically there is a decrease of Gram-positive bacteria and an increase in proteolytic and putrefactive organisms. The stools in consequence are foul and sometimes cheesy. The weight-curve shows no steady rise, but is apt to be irregular; the temperature is persistently subnormal, or is irregular with subnormal readings predominating; the infant is not emaciated, but small: flabby, and inert, with a somewhat prominent abdomen. Large quantities of urine are passed, and indicanuria is often considerable. The urine smells strongly of ammonia, and may be irritating to the child's skin. Vomiting is variable, often delayed until long after food, and smells of volatile fatty acids. The treatment is mainly to keep down the fat and protein and give fermentable carbohydrate freely. Cameron uses the following recipe: Four teaspoonfuls of baked flour are rubbed into a paste with a little milk, and more milk is added up to 12 oz., with constant stirring. The mixture is then strained through a sieve. In another vessel 10 teaspoonfuls of **Extract of Malt** are dissolved in 24 oz. of lukewarm water, with 20 gr. of **Carbonate of Soda.** The contents of the vessels are then mixed, and very slowly brought to the boil, with continual stirring, and kept boiling for two minutes. With this treatment the stools commonly show a rapid improvement, and within a few weeks the whole appearance of the child is altered for the better. After 6 to 8 weeks the ordinary milk mixtures may be resumed, and will generally be tolerated. As an alternative in the case of infants under 3 months old, **Buttermilk** with a high percentage of added **Lactose** may be given; and failing fresh buttermilk, a fresh lactic acid culture in skim milk. In a few severe and obstinate cases, attempts to return to ordinary milk mixtures fail, whilst butter-fat which has been subjected to a certain amount of cooking may be tolerated better. He uses the following recipe: Heat ¼ oz. butter until it melts and begins to simmer. Add one teaspoonful of baked flour, and, stirring continuously, heat it until a light-brown colour begins to appear. Add 3 oz. of water and a small teaspoonful of sugar, and bring to the boil. This mixture may be used with an equal part of milk.

Nervous unrest, with excessive emotional display, he regards as no infrequent cause of dyspepsia in young infants. The child has tense, rigid musculature, with clenched fists and anxious expression, is often crying, and suffers from clear signs of dyspepsia—wind, colic, explosive vomiting, and diarrhœa. He believes that this condition is the chief explanation of failure of nursing at the breast among highly-strung mothers and their equally excitable offspring. The infant is commonly thin, agile, and has very powerful movements. The abdomen is retracted, the limbs are stiff and rigid, the hands clenched, there may even be opisthotonos. The facial expression changes continually from alertness and great intelligence to anxiety and fretfulness. Sleep is fitful and light. Explosive vomiting and lienteric diarrhœa are commonly present. The treatment is only successful when it controls the nervous unrest. A good nurse is an invaluable part of it. Prolonged **Hot Baths**, lasting for a quarter of an hour, at a temperature of 105°, may be given two or three times a day until sleep is procured. **Hot Packs** serve equally well. It is a good plan to carry such a child always upon its mattress. Playing with the child, constant appeals to him, and all efforts to catch his attention and to stimulate him, must be abandoned. He should be in the open air as much as possible, and his room must be ventilated well. If such a routine is not successful, **Chloral** and **Bromide** may be given before meals. This ensures, as far as possible, that the infant is fed when placid and quiet. A certain latitude in the hours of meals may be allowed until sleep has become better.

According to Marfan,[2] treatment of *choleriform diarrhœa* includes restriction to boiled water or weak tea for two days at least and never more than four, usually for three, with very cautious resumption of feeding, supplemented by subcutaneous injection of **Camphor, Caffeine,** and **Epinephrin** to sustain the heart, raise the blood-pressure, and stimulate the nervous system. He has abandoned infusion of saline as superfluous. He advocates **Hot Baths** at 100·4° for 5 or 10 minutes, two or three times during the first day and once or twice on the second. If the pulse is imperceptible and there is danger of collapse, he adds **Mustard** to the water. After the bath the infant is dried and rubbed with cotton-wool dipped in **Alcohol** until the skin becomes red. He has nothing to say in favour of lavage in the toxic phase or of flushing of the bowel, while either may cause convulsions. He gives no drugs to check the diarrhœa, nor alcohol, during the toxic phase.

References.—[1]*Practitioner,* 1921, May, 153; [2]*Nourisson,* Paris, 1920, Nov. (abstr in *Jour. Amer. Med. Assoc.* 1921, Jan. 29, 343).

EAR, MIDDLE, DISEASE OF.

A. J. M. Wright, M.B., F.R.C.S.

ACUTE OTITIS MEDIA.

The importance of early and thorough treatment of every case of acute otitis media is generally recognized. Such treatment is directed towards conserving the hearing, preventing complications, and curing the disease before it becomes chronic. Three operative measures which may be employed are: incision of the tympanic membrane; operation on the mastoid process; and removal of tonsils and adenoids. The indications for one of these operations in any given case at any given moment are still under dispute.

Incision of the Membrane.—Sharpe[1] is of the opinion that any bulging of the membrane, however slight, calls for the performance of this operation. The meatus should be carefully cleansed and then disinfected with pure alcohol. Gas or some other general anæsthetic should be given, and a free vertical incision made behind the handle of the malleus. In his experience this early and free paracentesis will in almost all cases prevent a mastoiditis and lead to early resolution with conservation of hearing. Careful antiseptic precautions are essential, as a mixed infection from without is often a cause of chronicity. Kopetsky,[2] on the other hand, considers that incision of the membrane does not prevent mastoiditis. The elements which produce mastoiditis requiring surgical intervention are to be found in other factors than in the performance or otherwise of early paracentesis. These factors are the nature of the pre-existing systemic infection, the character of the invading organism, and the type of lesion which develops from its initial onset in the mastoid process. Paracentesis should be reserved for cases in which pus is present, and should not be done for otalgia. Callison[3] advocates paracentesis, but only when pus is present. The incision recommended is a horseshoe-shaped one leaving a flap supported on the handle of the malleus, with its attached base upwards. This is the reverse of the incision proposed by Lake (Medical Annual, 1920, p. 100). Leland[4] advocates multiple incisions in cases of acute otitis media with threatened mastoiditis. In cases with bulging of the posterior and superior segments of the membrane and swelling of the corresponding segment of the meatal wall, four incisions are employed: one through the posterior segment of the membrane, curving upwards and backwards on the bony canal wall deep down to the bone; three others through Shrapnell's membrane, one beginning at the posterior fold upward and out on the canal, another at the anterior fold, and another directly above the neck of the malleus. In conjunction with these multiple incisions he also employs Wright's solution to induce exosmosis (1 per cent **Sodium Citrate** and 4 per cent **Sodium Chloride**). The meatus is filled with the solution warm, and a gauze wick is inserted down to the membrane, the solution and wick being renewed daily until resolution occurs.

Operation on the Mastoid Process.—The indications for operation on the mastoid process in a case of acute otitis media are various, and the decision for or against operation in any given case is often difficult. Coates,[5] after giving a list of no less than seventeen points in diagnosis, states that not one is a positive indication for operation, but that it takes a variable combination of these points to establish the necessity for operative treatment. Clay,[6] in coming to the same opinion, states that mastoiditis is a condition presenting varying phases, and that every case is a law unto itself. Mollison[7] concludes that early diagnosis of acute mastoiditis is important in order that operation may be performed early to save the hearing. Diagnosis is easy in a case with acute onset, early rupture of the membrane, continued profuse discharge, pain, a swinging temperature, tenderness over the mastoid, and swelling of the deep meatal wall. When, however, only one or two signs are present, diagnosis is difficult, and a survey of all the features of the case essential. Luc[8] considers that, in any case in which an early paracentesis has been performed and yet the discharge continues profuse after three or four weeks, an operation on the mastoid should be performed.

The Removal of Tonsils and Adenoids.—Removal is not the generally accepted practice during the acute stage of an otitis media ; thus, Callison[9] considers that if the discharge has not cleared up after an interval of six weeks the nasopharynx should be cleared of adenoids if present. Glogau,[10] on the other hand, advocates that tonsils and adenoids should be removed during the acute suppurative stage, and states that the classical mastoid symptoms of pain, fever, redness, and swelling over the mastoid process may subside after this operation. Leland[11] also advises operation on the nasopharynx during the acute stage of the otitis.

Latent or Primary Mastoiditis.—The occurrence of an acute mastoiditis with an apparently normal middle ear and no history of previous discharge, is not a very rare condition. The infection may be conveyed by the blood-stream, but more probably infection takes place via the Eustachian tube and middle ear, the inflammation in the latter rapidly subsiding without perforation, and leaving a focus in the mastoid process. Zamora[12] relates 4 such cases, in none of which was there otorrhœa or a perforation of the membrane. Extensive suppuration was found in the mastoid process in all, and in 2 a thrombosis of the lateral sinus. Glogau[13] reports another case with an apparently normal middle ear but an extensive mastoid suppuration and extradural abscess.

Acute Mastoiditis : Operation Cavity treated with B.I.P.P. and Primary Suture.—This method, as employed by Tilley, was described in the MEDICAL ANNUAL, 1920, p. 104. Diggle[14] presents the results of employing the method in 20 cases. The average stay in hospital of these cases was only twelve days, and the hearing in the affected ear, as tested one year later, was good. It is essential to avoid using masses of the paste, as this produces œdema of the wound and delayed healing.

CHRONIC OTITIS MEDIA.

Conservative Treatment.—Campbell[15] has undertaken a series of 19 cases of chronic middle-ear suppuration selected as being resistant to other methods of treatment and as cases on which a radical mastoid operation would usually be performed. The method employed was that first introduced by Bezold, and is carried out as follows: All treatment is effected under visual control, and daily at first, the frequency being gradually reduced as the discharge dries up.

1. The tympanic cavity is washed out through the perforation with boracic

lotion at body temperature by means of an intratympanic nozzle attached with tubing to a rubber bag.

2. The meatus and, as far as possible, the middle ear are dried with wool on a probe.
3. The ear is politzerized, to force moisture from the middle ear.
4. Meatus and tympanum are again dried.
5. The middle ear and membrane are covered with a thin layer of boracic powder.

The most suitable cases are those with a central perforation. Of the 19 cases only 17 completed the treatment. Of these 17, in 14 the discharge completely dried up, the average length of treatment in these cases being forty-one days. [There is no doubt that thorough and skilled antiseptic treatment will cure a great many cases of chronic middle-ear suppuration. During the late war I had the opportunity of treating a large number of such cases in hospital, and was much impressed by the favourable results obtained. Similar results were obtained by others working under similar conditions. The great difficulty in civilian practice is to arrange for regular and skilled treatment; but when this ideal can be attained, the number of radical mastoid operations performed will be very much diminished.—A. J. M. W.]

Friel[16] has obtained successful results by employing **Zinc Ionization** in the treatment of chronic otorrhœa. The technique is as follows: The ear is first cleansed by syringing or dry mopping. With the patient lying on the sound side, the ear is filled with the zinc solution (zinc sulphate 75 gr., glycerin 2 fl. oz., water to 35 fl. oz.), air-bubbles being removed by aspiration with a pneumatic speculum. The electrode, consisting of a zinc wire protected from touching the skin by a vulcanite speculum, is then placed in the meatus. The indifferent electrode attached to the negative terminal is applied to arm or leg over a towel wet with saline. The current is gradually increased to 3 ma., and allowed to flow for ten minutes. The treatment is successful in cases in which the sepsis is confined to the mucous membrane of the tympanum. Bony caries, polypi, or mastoid involvement requires appropriate treatment in addition to the ionization. In a series of 217 cases treated, the result was known in 157. Of these, the discharge ceased in 111, and in only 7 of them was there some possible factor other than the ionization which might have brought about the cure.

COMPLICATIONS OF SUPPURATIVE OTITIS MEDIA.

Lateral Sinus Thrombosis.—Early diagnosis is of great importance. In a typical case this may be easy, but atypical cases are not uncommon. Guthrie,[17] in relating a case, emphasizes the difficulty that may occur. In this case, described as 'latent', the symptoms were an otorrhœa of three weeks' duration, pain in the left tonsil region, and pyrexia diagnosed at first as influenza. The continuance of fever with sweating, and tenderness behind the angle of the jaw on the same side as the otorrhœa, eventually led to operation and the discovery of a limited thrombosis of the lateral sinus. That not even otorrhœa is an essential symptom is shown by two cases related by Mollison,[18] in which a mastoid suppuration, with thrombosis of the lateral sinus, was found at operation, the membrane being intact in both cases. That infection took place via the middle ear is probably shown by the existence of earache for some days before the sinus thrombosis symptoms supervened. That lateral sinus thrombosis can take place, not only without otorrhœa, but also without fever, is shown by Piolti.[19] In his case an extradural abscess with sinus thrombosis was found at operation on an adult male. Pain in the side of the head had been present for three months, but discharge and fever were absent, and the membrane showed a slight injection only. Oppenheimer[20] emphasizes another difficulty in diagnosis in children. Fever, when present, is often taken to be due to the acute infectious disease of which the otitis is a complication, and also in them the temperature is not infrequently steadily high rather than remittent. He considers that a high temperature, continuing for several days after a mastoid operation, should demand prompt exploration of the lateral sinus. In 150 cases he has found the streptococcus to be the invariable causative organism. When suggestive symptoms were present after a mastoid operation at which the pneumococcus was found to be the infecting agent, sinus thrombosis was never found, but some other complication such as pneumonia.

Cavernous Sinus Thrombosis.—Although this is a rare condition, it occurs sufficiently frequently as a complication of suppurative otitis media to merit attention. In a well-established case, the bulging immobile eyeball, the extreme swelling of the conjunctiva, and the rapid depreciation of vision, combined with fever, are diagnostic. Rodger[21] considers that these cases should not necessarily be regarded as hopeless, and as cases of recovery without operation have been reported, every effort should be made to give operative help. He details two fatal cases secondary to suppurative otitis media. In one the thrombosis took the usual course of extending from the lateral sinus to the cavernous sinus via the petrosal sinuses. In the other, the absence of thrombosis in the lateral sinus and the expulsion of a worm-like small clot from it when it was opened led him to believe that infection had spread direct from the tympanum to the superior petrosal sinus and thence to the cavernous. In his opinion direct approach to the cavernous sinus, either by the frontal, sphenoidal sinus, or temporal route, is of very doubtful utility. In cases, however, which are secondary to thrombosis of the lateral and petrosal sinuses, he considers it possible that the cavernous thrombus is at first aseptic and due to a blockage of the outflow of blood from this sinus. In such cases he suggests that **Bleeding** from the upper end of the lateral sinus should be encouraged for a few seconds for several days after operation to minimize the risk of clotting in the cavernous sinus, and also to wash out by its outflow, perhaps, any commencing clot in the superior petrosal sinus. Wrigley[22] reports an interesting case which would seem to support this theory. A girl, age 17, with chronic otitis media, developed a high temperature with rigors, proptosis, and œdema of the eye on the same side as the diseased ear. The lateral sinus was opened, free bleeding at once taking place, and a small clot was expelled, which it is suggested came from the cavernous sinus. The case ended in recovery. It would seem possible that resolution may sometimes be assisted by the early incision of the lateral sinus in cases of cavernous sinus thrombosis.

Brain Abscess.—Adson[23] gives a study of 26 cases occurring in the Mayo Clinic during five years. Nine cases were operated on, and of these 5 recovered. The average leucocyte count for the series was 16,000. Optic neuritis was present in 9 cases. Local tenderness was noted in 12 cases ; in 8 of these it was over the site of the abscess. The duration of symptoms was from three days to three years. The prognosis was found to be most favourable in those cases which had lasted about six months, the abscess at this period being well encapsulated. During the earlier stages the condition is rather an encephalitis than a localized collection of pus, and surgical intervention is not of much assistance.

Hautant[24] gives indications for exploring, and the method of approaching, the retrolabyrinthine region in cases of intracranial complications of suppurative otitis media. In the majority of cases investigation of the parts in relation to the roof of the attic and antrum and of the posterior surface of the mastoid is sufficient. When, however, these two regions do not display any lesion, it is possible to explore the area posterior to the labyrinthine portion of the petrous bone in the neighbourhood of the saccus endolymphaticus. For such an operation to be necessary three conditions must be present : (1) There must be a destructive labyrinthine lesion, i.e., no response to vestibular tests ; (2) Infected lesions of the middle ear must be active, as shown by headache, fever, and changes in the cerebrospinal fluid, either increase of albumin, cells, or tension ; (3) Operation must not reveal any other intracranial lesion, the retrolabyrinthine exploration only being performed in the absence of such other cause for the symptoms. The conditions which may be present in this region are similar to those found in the roof of the attic—osteitis, extradural abscess, etc. ; and in addition a minute abscess or empyema of the saccus endolymphaticus may be found. The abscess is recognized by being very small, no larger than a lentil, and outside both the bone and the meninges. The region is exposed by removing the bone surrounding the posterior portion of the semicircular canals. In addition to exposing an abscess of the endolymphatic sac, it allows of approach to deeply situated cerebellar abscesses, and of the drainage of the lateral cistern in meningitis.

References.—[1]*Brit. Med. Jour.* 1921, ii. 403 ; [2]*Amer. Med.* 1921, xvi, 26 ; [2]*Med. Record*, 1921, March 5, 386 ; [4]*Boston Med. and Surg. Jour.* 1921, March 10, 256 ; [5]*Therap. Gazette*, 1920, Nov. 15, 761 ; [6]*Hahnemann Month.* 1920, lv, 559 ; [7]*Guy's Hosp. Rep.* 1921 ; Jan., 129 ; [8]*Presse méd.* 1921, Jan., 53 ; [9]*Med. Record*, 1921, March 5, 386 ; [10]*Laryngoscope*, 1920, Nov., 316 ; [11]*Boston Med. and Surg. Jour.* 1921, March 10, 256 ; [12]*Guy's Hosp. Rep.* 1921, April, 216 ; [13]*Laryngoscope*, 1920, Nov., 316 ; [14]*Jour. of Laryngol. and Otol.* 1921, Oct., 471 ; [15]*Ibid.* March, 121 ; [16]*Clinical Jour.* 1921, April 27, 270 ; [17]*Jour. Laryngol. and Otol.* 1921, March, 127 ; [18]*Ibid.* Sept., 440 ; [19]*Arch. ital. di Otol.* 1920, xxxi, No. 5 ; [20]*Arch. of Pediatrics*, 1920, Jan. ; [21]*Jour. Laryngol and Otol.* 1921, April, 169 ; [22]*Ibid.* Aug., 381 ; [23]*Jour. Amer. Med. Assoc.* 1920. Aug. 21 ; [24]*Lancet*, 1921, i, 282.

ECCHYMOSES.

Sir W. I. de C. Wheeler, F.R.C.S.I.

Sufficient attention has not been called to the important diagnostic sign of ecchymosis in cases of fracture. In fractures of the fibula without displacement, in the course of a few days bruising will have extended as a rule almost anatomically in the line of the bone. The fracture may have been caused by slight violence, and there may have been no other obvious sign. In the case of the mandible, the lower teeth on examination may be found to be in good alinement ; on grasping the jaw there is no unnatural movement, and crepitation may be absent ; but if localized ecchymosis is persistent, a fracture should be suspected. The same applies to fractures of the radius and ulna, the base of the skull, and other bones. Brechot[1] emphasizes that a tardy and extensive ecchymosis after an injury is almost a certain sign of fracture of the bone. With extracapsular fracture of the neck of the femur and trochanter the crushing of the spongy bone causes an extensive ecchymosis on the outside of the thigh, but with intracapsular fracture the hæmorrhage is slight, and it usually presents only in the base of the inguinal triangle. Tearing off the external malleolus may entail a linear ecchymosis which may be the only symptom ; with a sprain, the ecchymosis encircles the external malleolus and extends downward. Fracture of the heel-bone causes considerable ecchymosis, which surrounds the ankle and spreads upward and down on the sole.

Ecchymosis at the umbilicus suggests a wound of the convex surface of the liver.

The blood from a superficial lesion develops an ecchymosis within a few hours. It requires twenty-four or thirty hours for it to infiltrate the skin from a lesion in the subcutaneous cellular tissue. Deeper than this it may take from three to six days to appear. The ecchymosis is particularly instructive with regard to fractures of the skull. A horseshoe ecchymosis of the palate is a symptom of fracture of the upper jaw. An increase in the blood-pressure may induce an apparently spontaneous ecchymosis.

REFERENCE.—[1]*Progrès méd.* 1921, Feb. 19, 79.

ECLAMPSIA. (*See* PREGNANCY, DISORDERS OF.)

ECTOPIA VESICÆ. (*See* EPISPADIAS AND ECTOPIA VESICÆ.)

ECZEMA. (*See also* DERMATITIS.)

E. Graham Little, M.D., F.R.C.P.

ETIOLOGY.—Harris[1] left notes of an address delivered at the Chicago Dermatological Society, which were edited after his death by Stokes, and form the substance of this paper. Harris took the view that the important factor in the production of an eczema is an increased irritability of the skin or some structure in it, this abnormal irritability resulting in a reaction of the skin to irritants of varying degrees of intensity. "The skin in eczema is in an unstable condition, ready to respond to the slightest irritant by the production of an inflammatory reaction which we call eczema." That this irritability does not reside in the epithelial cell is shown by the fact that it is not specific, and it varies too rapidly. The author discusses the phenomenon of itching, which he regards as "inherent in the epidermis", and consequently the intra-epithelial nerve fibrils would be a mechanism involved in the sensation. This sensation can be stilled by the injection of epinephrin, a normal constituent of the blood. A deficiency of epinephrin might account for the increased sensitiveness of the skin, which he postulates as a condition of eczema, and also account for the itching. Recalling the part played by gastro-intestinal disorders in the determination of eczema, the author speculates on the possibility of intestinal toxins reducing the epinephrin. Now histamine is a toxic amine produced in the intestine in certain cases of intestinal disease, and its physiological properties make it an antagonist to epinephrin at almost all points. Some abortive experiments were made to estimate the frequency with which histamine is found in cases of eczema, but they could not be completed.

Seborrhœic Eczema.—Unna[2] persists in his well-known theories of the causation of seborrhœic eczema as due to hypersecretion of the sebaceous glands, and is quite untouched by the more modern explanation of a microbic origin. He reiterates his view, in which he has found few supporters, that seborrhœic eczema is a sort of bridge which unites the dry eczemas and psoriasis. He regards these diseases as essentially due to the same cause, but allows that seborrhœic eczema is more easily cured than psoriasis, even with mild reducing agents such as sulphur or zinc paste.

Protein Sensitization in Eczema.—Fox and Fisher[3] have conducted some experiments in eczema of adults, using Chandler Walker's technique, which is described as follows: A small number of cuts, each about an eighth of an inch long, are made on the flexor surfaces of the forearm. These cuts are made with a sharp scalpel, but are not deep enough to draw blood, although they do penetrate the skin. On each cut is placed a protein, and to it is added a drop of tenth-normal sodium hydroxide solution to dissolve the protein and to permit of its rapid absorption. At the end of half an hour, the proteins are washed off and the reactions are noted, always comparing the inoculated cuts with normal controls on which no protein was placed. A positive reaction consists of a raised, white elevation or urticarial wheal surrounding the cut.

The smallest reaction that they call positive must measure 0·5 cm. in diameter. All larger reactions are noted by a series of plus marks, and any smaller reaction is called doubtful.

All the cases were tested with commercial proteins. Special care was taken to exclude trade eczemas, and those of parasitic origin, or secondary to pustular infections. Of the 60 patients tested, 41 gave entirely negative reactions, the number of proteins used in each case varying from thirteen to thirty-seven (an average of twenty-four). The attempt was always made to test the foods that were ordinarily eaten by each individual patient. There were 19 patients that reacted positively to one or more proteins. Each individual was tested with fifteen to forty-four proteins (an average of twenty-five). Five patients reacted to celery, 5 to cheese, 4 to bean and turnip, 3 to cabbage, lettuce, and sweet potato; 2 to carrot, cauliflower, oat, and potato, and 1 each to asparagus, beet, coffee, corn, grape-fruit, onion, orange, oyster, plum, pork, rye, tomato, and wheat. It was to be remarked that the great majority of reactions, and especially all the severe ones, were given by vegetables.

The authors quote another series of experiments, unpublished, conducted by Ramirez, the results of which were as follows: Of the 66 cases in which the test was applied by Ramirez in persons of fifteen years or older, 20 (or 30 per cent) gave positive reactions, and 46 negative cutaneous reactions. In all the positive cases the reaction was to more than one protein. The foods that caused positive reactions in the order of frequency were: corn, rice, wheat, egg-white, potato, celery, pork, lettuce, cabbage, beef, rye, fish, crab, lobster, and milk. None of his patients received any treatment whatever, but were simply put on a diet modified according to the results of the tests. Of the 20 patients with positive reactions, 6 were cured, 9 improved, and 5 unimproved. In the cases of cure and improvement, the improvement was noticed in the first week. In the cases of apparent cure, there were no recurrences within six months, and in some for one year. Tests performed six months later in the cured patients were negative.

TREATMENT.—Von Zumbusch[1] has some very practical suggestions to make in the treatment of eczema. He uses the term clinically for any inflammation of the skin that commences with small itchy papules which may change to blisters and pustules and wet patches. Treatment must be directed to symptoms in the absence of the definite causation being understood. There is no specific for eczema and never will be. He considers the subject under three headings: (1) External cause, if ascertainable; (2) Individual predisposition; (3) Changes in the skin itself. Treatment begins with a clean-up of the site by means of a pad of cotton-wool dusted with an indifferent powder, strong applications such as ether soap being vigorously condemned. To remove scabs, the application of **Ung. Diachyli** is the best means. Wet patches may be dabbed with 2 per cent **Silver Nitrate** solution. For hairy parts powders and pastes are not to be used, and for these a 5 per cent **Sulphur Ointment** is recommended. In the acute early stages **Powders** are most suitable applications (**Talc, Starch**). Or the parts may be wiped over with 70 per cent **Rectified Spirit** or with the addition to this of 1 to 2 per cent **Glycerin.** If these measures irritate too much, the following ointment is to be substituted: **Sol. Alumin. Acet., Lanolin,** āā 5; **Ung. Leniens,** 20.

In older cases more energetic measures may be used. **Pastes** are here especially valuable, such as the following formula: Zinc. Oxid., Talc, āā x; Vaselin. Flav. Americani, xx. This is to be applied thinly with the hand. In dry squamous types, and especially in infective conditions, **Tar** is indicated, but should not be used when the skin is still irritable. In the latter eventuality **Dry Cold,** e.g., an ice bottle applied through several layers of gauze, is suggested. For very chronic eczematous patches **X rays** are recommended.

REFERENCES.—[1]*Arch. of Dermatol. and Syph.* 1921, May, 579; [2]*Münch. med. Woch.* 1921, March, 547; [3]*Jour. Amer. Med. Assoc.* 1920, Oct. 2, 907; [4]*Münch. med. Woch.* 1921, April, 1, 401, and April 15. 461.

ELECTROTHERAPEUTICS. (*See also* X-RAY DIAGNOSIS and RADIOTHERAPY.)

C. Thurstan Holland, M.R.C.S.

The concluding portions of an interesting sketch of the "History of Electrotherapy" by Colwell[1] should be read. These papers contain much of great historical interest, and illustrations of many of the first electrical instruments used in medicine; they also contain a vast amount of information as to the origin of various forms of electrical treatment in vogue at the present time, and record the work of many of the pioneers.

Faradic Current.—Leitch[2] considers that the effects obtained by this current when infrequently interrupted—about once per second—are similar to those of ordinary faradism, but slow interruption has the advantage of being comparatively painless. This painlessness enables one to use a stronger current which gives larger contractions, and the end-results are greater. He describes the instruments used and the technique adopted, illustrating the paper with short notes on cases of diurnal and nocturnal *enuresis, fibrous adhesions round joints,* and so on. In a paper on the action of the intrinsic muscles of the foot and their treatment by electricity, Levick,[3] after discussing the arch of the foot and the action of the interossei and other muscles, describes a method by which, with the use of a surging faradic current, he sends a current streaming through the intrinsic muscles of the foot. Faradic treatment given in the manner suggested is claimed to have surprisingly rapid results in the class of cases indicated.

Galvanic Current.—Robinson[4] has treated a very long-standing suppuration of the sinuses connected with the nasal cavity with the galvanic current. He gives the history of the case in detail, and also the exact technique adopted, using an electrode in the nose connected to the negative pole. The case was under observation for ten years, and was then cured in a few weeks by the electrical means used: a point made is that a current of 5 ma. only was necessary at each application.

Electrotherapy in the *neuritis of motor nerves* is the subject of a carefully thought out paper by Delherm and Laquerrière.[5] This deals with applications acting on tissues irritating or compressing the nerve, without excitomotor action: applications acting on the nutrition, circulation, and trophic mechanism of the part affected. The authors show that the electrotherapeutics of motor nerve neuritis are not of one kind only, different methods having to be used for different cases; and they conclude with a summary of these methods and the manner in which each accomplishes its purpose. In *sciatica,* Goulden[6] advocates the uses of *galvanic acupuncture* in those cases of the interstitial type associated with inflammatory changes in the sheath and connective tissues—nodular fibrositis. After discussing the mode of action, the equipment for treatment is described, and the exact methods which he adopts: he considers that a reliable guide to the correct position of the needle is the fact that when the needle is in its place the patient feels the same pain as that complained of.

Action of certain Electrical Treatments on the Blood, Blood-pressure, and Metabolism.—Bain[7] and others have conducted an experimental investigation into this question, taking as their subjects three normal individuals.

The experiments were made on the high-frequency current, diathermy, and the Bergonié treatment, and are explained with a summary of results and tables of blood examination, blood-pressure, and urinary output.

Ionization.—Fricl[8] relates some experiments he has made to show the rationale of zinc ionization in the treatment of *local sepsis*. He then discusses the manner in which he arrives at the correct dosage for various conditions, and states from experience that the approximate dose for the middle ear is 3 ma. for 6 minutes, for the maxillary antrum 20 ma. for 10 minutes, for the sphenoidal sinus 7 ma. for 10 minutes, and for the frontal sinus 10 ma. for 10 minutes. He does not consider ionization a panacea, but thinks it has a definite place in the treatment of septic infection of these areas.

Diathermy.—Hirsh[9] advocates the use of this in some cases of *bone lesions* due to war injuries. He details certain cases, and illustrates his paper with numerous radiographs of the injured bones before and after treatment. The cases are those of fractures with non-union and osteomyelitis. The same author[10] has also used diathermy in cases of *chronic empyema* so successfully that in the hospital in which he is working it has become a recognized addition to the treatment of this condition. A striking case is narrated with full details as to history, condition, etc., and various radiographs illustrate the alteration brought about. In *diseases of the nose and throat* Harrison[11] discusses its surgical uses in such conditions as nævi, lupus, malignant disease, etc. He gives a lucid account of the exact details of the methods he adopts, its indications, its advantages and disadvantages. Whilst recognizing that it is no more a cure for malignant disease than any other treatment, it can be used not only in operable cases with greater safety and with better advantages than the knife, but it is also useful in cases altogether beyond the scope of the knife.

Electrolysis.—Curtis Webb[12] returns to the treatment of *hæmorrhage* by electrolysis, and considers that it is especially useful in what he describes as intero-external hæmorrhoids associated with great pain, hæmorrhage, and discharge. He is convinced that in these cases electrolysis is the most certain and the least painful method of treatment. Cases are related and full details as to technique described.

Ultra-violet Radiation.—Mottram and Russ[13] have examined patients by means of these radiations passed through specially-made black glass. Viewed by means of this invisible ultra-violet radiation, amongst other things the skin shows a generalized violet fluorescence, also the teeth and nails; on the skin of the face were seen numerous dark, non-fluorescent spots, and also minute brightly fluorescent spots. In drawing attention to these facts the authors suggest the possibility of some medical uses.

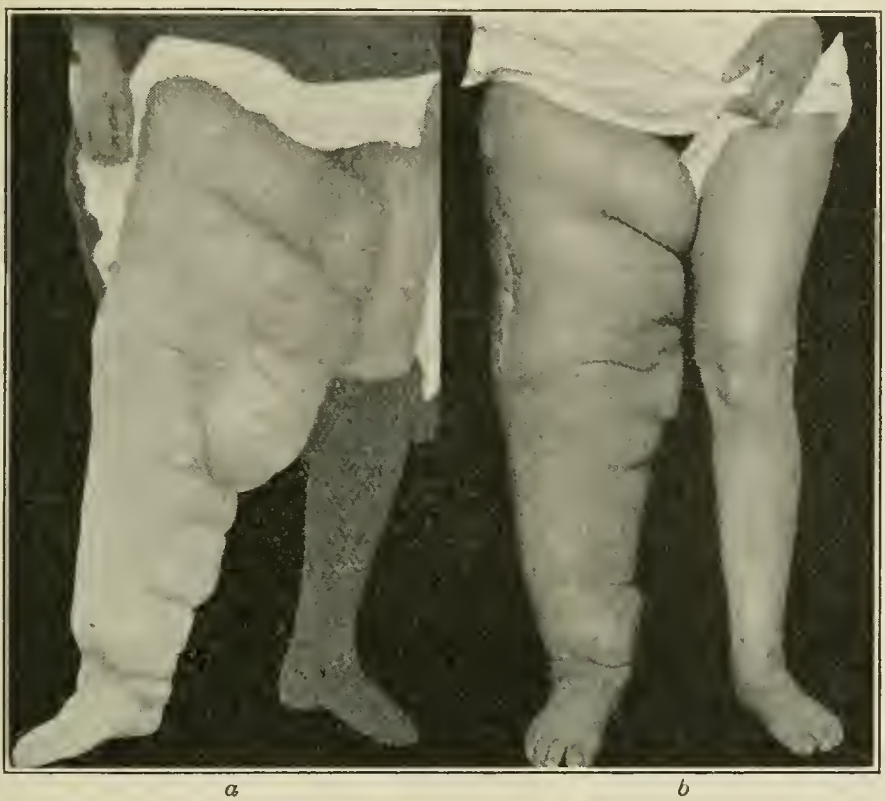
REFERENCES.—[1]*Arch. of Radiol. and Electrotherap.* 1920, Oct., 129, Nov., 169, and 1921, Feb., 271; [2]*Ibid.* 1921, March, 290; [3]*Brit. Med. Jour.* 1921, i, 381; [4]*Arch. of Radiol. and Electrotherap.* 1921, May, 386; [5]*Jour. de Radiol. et d'Electrol.* 1921, 97: [6]*Brit. Med. Jour.* 1921, i, 523: [7]*Lancet*, 1921, i, 905; [8]*Med. Press*, 1920, Dec., 431: [9]*Surg. Gynecol. and Obst.* 1921, Jan., 74; [10]*Med. Record*, 1920, Dec., 1015; [11]*Brit. Med. Jour.* 1921, i, 220; [12]*Ibid.* 457; [13]*Proc. Roy. Soc. Med.* (Electrotherap. Sect.), 1920, 143.

ELEPHANTIASIS.

Sir W. I. de Wheeler, F.R.C.S.I.

A. K. Henry[1] describes an encouraging result following **Kondoléon's Operation** on the lower limb in a case of enormous elephantiasis nostras of twenty-seven years' duration (*Fig.* 19*a*). The operation was performed in three sittings (*Fig.* 19*b*).

Regarding the principles underlying the operation, he points out: (1) That the effect of removing wide areas of fascia is to drain the superficial lymph-swamp into the blood-vessels of the muscles rather than (as Kondoléon suggests) into the deep lymphatics (the latter must have been blocked in certain cases where the operation has succeeded); (2) The drainage of the loculated subcutaneous tissue is a *local* drainage effected in the neighbourhood of each fascial opening; (3) The free removal of fascia produces a series of muscle herniæ, and the alternate bulging and withdrawal of the muscles at the fascial openings serves to aspirate lymph from the subcutaneous tissues into the muscular strata.



a b

Fig. 19*a*.—Showing the condition one year previous to operation. During this period the proximal fold in the right thigh had become pedunculated, and at the time of operation hung down almost to the level of the knee.

Fig. 19*b*.—Showing the condition 11 months after the first operation and 4 months after the third operation. (*By permission of the 'British Journal of Surgery'.*)

REFERENCE.—[1] *Brit. Jour. Surg.* 1921, July. 111.

EMPYEMA. (*See* THORACIC SURGERY.)

ENCEPHALITIS LETHARGICA. (*See* EYE AFFECTIONS; HICCOUGH, EPIDEMIC; OPTIC NEURITIS.)

ENDOCARDITIS, ULCERATIVE.

Carey F. Coombs, M.D., F.R.C.P.

In last year's MEDICAL ANNUAL a full account of recent work was given, with particular reference to 'subacute bacterial endocarditis'. There is therefore no need to deal with it again at length, but Cotton's[1] conclusions, based on a study of 55 cases, must be quoted. He finds it impossible to draw any real line of demarcation between the subacute and the chronic grades of ulcerative endocarditis. [It may be added, there is no real difference, clinically or anatomically, between the acute, the subacute, and the chronic forms, save that these terms roughly indicate the existence of a continuous scale of virulence.—C. F. C.] Of the patients with gross valvular disease attending the special cardiac clinic, 8 per cent were found to present symptoms of active endocardial infection. The diagnosis may be made on the symptoms alone, but a positive blood-culture is of value as a confirmatory fact. The common clinical picture is that of gross valvular disease, with pallor, splenic enlargement, and clubbing of the fingers. Occasionally, however, the patient comes under observation as a case of nephritis, and the urine usually contains blood and albumin. Hæmorrhages under the skin and also into the retinæ should always be looked for. The absence of fever is no bar to the diagnosis. Occasionally the Wassermann test is positive. It is interesting to find an account by Becher[2] of cases exactly similar, seen by him in German ex-soldiers. So impressed is he with this association with military service, that he labels the lesion 'war endocarditis'. It is generally agreed that in such cases as these the infecting organism is usually *Streptococcus viridans*, closely akin to, if not identical with, the streptococci found in the normal alimentary canal.

Cases of ulcerative endocarditis due to the pneumococcus *Type* 1 and to the gonococcus are reported by Thomas and O'Hara[3] and Smith[4] respectively. In the first case the bicuspid and in the second the pulmonary valve exhibited the principal lesions. The cases were not singular clinically.

Levison[5] has used transfusion with **Blood from a Person Immunized** against the infecting streptococcus in a case of chronic ulcerative endocarditis, but without benefit. A successful plan of treatment has yet to be discovered.

References.—[1] *Brit. Med. Jour.* 1920, ii, 851 ; [2] *Münch. med. Woch.* 1921, 267 ; [3] *Johns Hop. Hosp. Bull.* 1920, 417 ; [4] *Amer. Jour. Med. Sci.* 1921, i, 824 ; [5] *Jour. Labor. and Clin. Med.* 1921, vi. 191.

ENDOCRINOLOGY : A REVIEW OF THE PRESENT POSITION. (*See also* Graves' Disease ; Neurological Surgery ; Thyroid Surgery.)

W. Langdon Brown, M.D., F.R.C.P.

Of recent years endocrinology has excited so much interest and, one may add, so much uncontrolled speculation, that it is a little difficult to assess what actual progress has been made. Perhaps it will render the whole subject more intelligible if we first attempt to view the endocrines in their proper biological relationship. This will, at any rate, provide some general principles to guide us through the maze of fact and hypothesis.

Before a nervous system was developed at all, and even later when, although constituted, it had not yet acquired the elaborate associative mechanisms present in higher vertebrates, animal responses chiefly took the form of heliotropism, chemotropism, geotropism, stereotropism, and the like. It might appear that an animal so directed would act like an uncontrolled machine and soon meet with disaster. That this may readily happen is sufficiently illustrated by the behaviour of a moth towards a candle. That it does not invariably happen is due to internal controls apparently of a chemical nature. Thus, Loeb has shown that bees before the nuptial flight become intensely positively heliotropic, but immediately afterwards the queen bee loses this heliotropism and and becomes stereotropic, which leads her to begin a subterranean existence where the new nest is founded. The condition of the gonads here profoundly modifies the tropism of the animal. Animals that are indifferent to light can be made positively or negatively heliotropic by certain chemical substances such as acids, alcohol, and caffeine. Thus, *Daphnia* become positively heliotropic in the presence of CO_2. A caterpillar acquires a positive heliotropism till it is well fed, when it loses it ; in this way it finds the few young leaves at the top of a twig, towards which it is driven by its heliotropism ; having eaten these, it is free to move down again until again driven up another twig by the same process. These simple examples show how the conduct of an animal without associative mechanisms (and therefore without consciousness as ordinarily understood) is modified by chemical means. As Loeb says, the theory of tropisms is at the same time the theory of instincts, if due consideration is given to the rôle of hormones in producing certain tropisms and suppressing others.

Bolk[1] has developed in an interesting, if highly speculative, manner this conception of hormones exercising a selective repression in some directions so as to promote higher developments in others. Thus, fœtal apes lack pigment and hair, and he attributes the partial persistence in man of such embryonic characteristics to a suppressive action of the adrenals. Again, he thinks that the human cranial sutures are kept open by the action of the thymus, thus allowing the brain to reach its present eminence. He attributes the existing conformation of the human skull to the pituitary, so that when this is diseased, as in acromegaly, there is a reversion to a simian shape. One might add that the changes in osteitis deformans could be similarly explained. He regards the pineal gland as retarding sexual maturity in the interests of a more prolonged somatic development, for in higher species the individual counts for more and fertility for less. In anencephaly the growth of the brain stops at the fish stage, while the adrenal cortex fails to develop in the striking way it does when the cerebral hemispheres grow normally. Elliot Smith suggests that more probably the great development of the brain is directly responsible for repressing simian traits, the endocrine glands being at most the mechanism through which this works. This would be more in accordance with the general trend of evolution.

To a certain extent every product of cell activity has an effect on every other tissue. Thus CO_2, which can modify the tropisms of a lowly animal, is a respiratory stimulant in ourselves, and in small doses actually improves the contractions of the heart. By this action on respiration and circulation its excretion is facilitated. Similarly, urea is a diuretic, which is an obvious advantage. But end-products in animal metabolism apparently only act in animals as stimulants to their own removal. Intermediate products such as kreatin and choline do have some general effects, but for the most striking influence on metabolism we must look to specially elaborated secretions, the hormones, produced by ductless and other glands. From a study of hormones and vitamins we have learnt the powerful effect of even infinitesimal doses. The latter are as characteristic of vegetable as the former are of animal life. As far as we can tell they are not greatly dissimilar chemically, while the lack of either may produce somewhat similar defects. Since vitamins are only made by vegetable life, we have here an example of the ultimate dependence of animals on vegetables. Nowhere is this better seen than in the ductless glands, which are profoundly affected by loss of vitamins. Indeed, this may be the way in which vitamins exert their control. When Hopkins[2] discovered that the various fractions resulting from protein disintegration had very different effects on growth, he was drawn to conclude that potent small fractions had some dynamic function apart from nutrition. Thus, tryptophan forms less than 2 per cent of the protein molecule, yet in its absence growth ceases. He had previously shown that under the influence of bacterial action in the intestine tryptophan breaks up into indol and skatol. These substances, if absorbed, are largely conjugated by the liver into ethereal sulphates, in which form they are excreted in the urine. But recently Kendall has made the striking observation that the active principle of thyroid secretion is also a compound of indol, into which iodine enters. This appears to justify Hopkins' contention. The formation of the indol nucleus appears to be beyond the powers of the animal body, which requires it ready made. This raises the speculation as to whether we do not depend on intestinal bacteria, particularly *B. coli*, for the first step in the preparation of one of the most active and important hormones—indeed, a hormone which is essential to adult development; whether, in fact, we have not here another example of the interdependence of animal and vegetable life. During the nursling period the child gets thyroid secretion from its mother's milk, and during that period *B. coli* are hardly present in its bowel. Herter has attributed one form of infantilism to persistence of the intestinal flora of the nursling period. The suckling child has not a very active pancreatic juice, and it is the pancreatic juice which splits off the tryptophan from the protein, just as *B. coli* splits off indol from tryptophan. Normally then, *B. coli* enter the bowel just about the time pancreatic juice becomes more active and the child is called upon to manufacture its own thyroid secretion. In this connection McCarrison's observation on the influence of intestinal toxæmia in producing thyroid enlargement is of special interest, as it would appear to be an example of a pathological exaggeration of a physiological process.

It is impossible to understand the endocrine system without taking the autonomic nervous system into account. Bayliss and Starling's discovery of secretin in 1902 opened out a vista of a chemical control of the body, in which the nervous system merely acts as a trigger, firing off a series of reactions. This conception was elaborated until it bid fair to dethrone the nervous system from its supreme position, although Langley had already provided the antidote by his generalization that the action of adrenalin on any part is the same as that obtained by stimulating the sympathetic. Considering the struggle the nervous system has had to obtain control over the body, a struggle well portrayed in G. H. Parker's book *The Elementary Nervous System*, it is not likely that it would abdicate its suzerainty in favour of the more ancient dynasty of chemotropism. Without defensive mechanisms no animal can survive in the struggle for existence, and, as evolution proceeds, the apparatus for defence comes under the control of the central nervous system. The sympathetic nervous system being originally evolved for rapid defensive purposes, it is not surprising to find that it retains certain primitive structural and functional features. On the structural side this is shown in the peripheral position of its ganglion cells, in its acting through nerve nets, and in the way its adjustor neurones lie largely outside the central nervous system. Functionally it recalls primitive methods in its lack of discriminative sensibility and in the urgent immediate, widespread, and explosive character of its response.

As the nervous system assumed more complete control, more rapid defensive reactions became possible, but the older chemical mechanisms persisted, both influencing and, in their turn, influenced by the nervous system. For the sympathetic nervous system entered into a close alliance with the endocrine glands, which represent a special survival of the old chemotropic methods of control. The closeness of this alliance is particularly well seen in the adrenals. The chromaffin cells and the sympathetic ganglion cells migrated out from the central nervous system together, but the latter gradually became the more abundant, while the connector fibres of the sympathetic end around both alike, and stimulate them to action. The medulla of the adrenals and the post-ganglionic elements of the sympathetic nervous system are homologous structures; and there is a gradual predominance of the nervous over the chemical element in the partnership as the higher levels of the nervous system are evolved. Further, their influence is reciprocal—the sympathetic exciting the secretion of adrenalin, while adrenalin in turn stimulates the sympathetic endings. Herein we can begin to appreciate the full significance of Langley's generalization. A similar reciprocity exists between the thyroid and the sympathetic: the sympathetic stimulates the thyroid secretion, which, in its turn, lowers the threshold to sympathetic stimulation. Moreover, thyroid secretion quickens the whole range of the metabolic activities of the body, and that is precisely how the sympathetic activates the body for flight or fight.

The autonomic, vegetative, or visceral nervous system consists of two great divisions—the sympathetic, and the parasympathetic or extended vagus. The former is katabolic, converting potential energy into kinetic and facilitating outward manifestations of that energy, while the latter is anabolic, directing energy inwards where it is stored up. When these two are distributed to the same structure their action is always antagonistic, and when one is stimulated the other is inhibited. The rhythm of life largely depends on the fluctuating balance between these two. The parasympathetic plays the chief part in the digestion and assimilation of food, the sympathetic spends the energy thus derived. In sleep the parasympathetic gains control, and the arrest of external manifestations of energy lasts until the balance is restored in favour of the sympathetic, when the subject awakens ready to expend energy again.

Each of these great divisions co-operates with a group of endocrine glands—the sympathetic with the adrenals, thyroid, and pituitary, the parasympathetic mainly with the glands of the digestive organs and their annexes. Possibly the parasympathetic co-operates also with the parathyroids and some lymphoid structures, but this is still doubtful.

Evidence is steadily accumulating as to the way in which the katabolic group of glands—the thyroid, adrenals, and pituitary—mutually co-operate, while each antagonizes the pancreas. Thus the former lower sugar tolerance and tend to increase the blood-sugar, while the effect of the latter is precisely opposite. The antagonistic effect of these glands on the pupil is referred to later. Pemberton and Sweet have shown that after excision of the adrenals there is a continuous secretion of pancreatic juice which can be temporarily checked by injection of adrenalin. The diastase in the urine is believed to be due to reabsorption of this constituent of pancreatic secretion into the blood-stream. It is present in increased amount when the pancreatic duct is obstructed. On the other hand, Mackenzie Wallis has found that it is diminished in hyperthyroidism, which suggests another way in which the thyroid shows its antagonism to the pancreas. This will probably form a valuable addition to the laboratory tests for hyperthyroidism described later. Clinical evidence as to co-operation between the members of the katabolic group is supplied by G. R. Murray[3] when he says that he has never seen acromegaly with myxœdema, or Fröhlich's syndrome with Graves' disease. If one member of the group is overacting or underacting, the others tend to do so as well, while the antagonist will correspondingly function too little or too much.

Not only is the sympathetic-endocrine system devised for defence against the external foe, but it also plays a large part in the defence against internal invasion by bacteria. Cretinous and myxœdematous patients are specially susceptible to this invasion. Sympathicotonics (i.e., those whose sympathetic nervous system tends to overact) often react well to infection; while those who show a feeble sympathetic response, such as low blood-pressure, do not. In the latter the adrenals cannot assist, and may show signs of exhaustion at the necropsy.

It has recently been recognized that the cerebral vessels are remarkably impermeable to drugs and toxins as long as they retain their integrity. How then do bacterial infections produce fever? The old conception of their stimulating some heat-regulating centre of the brain becomes untenable.

Fevers are known to be followed by changes in the adrenals and thyroid, but Cramer[4] has been able to show that anything which calls for increased production of heat definitely increases the secretory activity of these glands. Mere exposure of a mammal, though not of a cold-blooded animal, to a low temperature will effect this. The injection of the drug known as T.H.N. will produce similar changes, together with all the phenomena of heat-stroke, and only exposure of the injected animal to cold will prevent a fatal issue. Cramer has found similar changes in hyperpyrexia, and to a less degree in all fevers. He regards the heat regulation of the body as mainly effected peripherally, and points out what a profound effect climate must therefore have on the endocrine glands. Indeed, when one compares the brain, rigidly shut off in its bony box, with the peripheral apparatus in the skin, possessed of sensitive end-organs, responsive blood-vessels, and sweat glands, together with the power of acquiring protective pigment, the case for a peripheral regulation of the temperature becomes so plausible as to cause wonder at its being overlooked so long. This was, no doubt, because, as long as the close ties between skin, sympathetic nervous system, and endocrine glands were not appreciated, it was difficult to see how sufficient co-ordination could be obtained. It also explains how an acute or chronic bacterial infection produces changes in the endocrine glands associated with the sympathetic nervous system, usually leading to oversecretion in the active stage, and undersecretion during the consequent exhaustion. Thus, Squier[5] reports two cases of hyperthyroidism in which complicating infections caused a marked increase in the severity of the thyroid symptoms, followed, after the acute infection had subsided, by striking improvement, which he attributed to actual loss of secretory tissue, through post-infective sclerosis of the gland.

A curious point, which has not received much attention, is that the endocrine glands are chiefly derived from vestigial remains of structures which in some instances appear to have had originally a different function. Thus, the thyroid, which arises from the ventral aspect of the pharynx simultaneously with the gills and gill-slits, and which formerly opened by the thyroglossal duct at the foramen cæcum, is regarded by Gaskell as the persistent remains of the invertebrate palæostracan uterus. The parathyroids, on the other hand, do not develop until the gills degenerate and the gill-slits close. The thymus also arises from the gills and gill-slits, being partly ectodermal and partly endodermal in origin. The pituitary appears to have arisen in connection with the central canal of the nervous system, and probably represents the green gland or kidney of the palæostracan. The pineal gland almost certainly represents the old median eye. The adrenals, on the other hand, show no change of function, the medulla having originated with the sympathetic nervous system, with which it always remains closely associated ; while the originally distinct cortex came, like the interstitial cells of the gonads, from the mesonephros.

Another generalization which seems to be permissible is that, as special cells were of necessity set apart for reproduction as soon as the protozoon evolved into a multicellular organism, and even before the latter developed a nervous system, it is only to be expected that a close relationship should persist between the gonads and the primitive chemotactic mechanism now elaborated into the endocrine glands. And since the sympathetic nervous system entered into a defensive and offensive alliance with the endocrine glands, a basic tripod came to be formed which was entrusted with the duty both of the preservation of the individual and the continuity of the species. Their structural association is indicated by such facts as the common origin of the adrenal cortex and the interstitial cells of the gonads from the Wolffian body, and the development of the thyroid from the uterus of the palæostracan ancestor. Their close association is shown in disease as well as in health, and is reflected in many psychoneuroses. Disease is not likely to manifest itself for long in one limb of this tripod without affecting all three.

Having thus attempted to place the endocrine glands in what appears to be their appropriate biological setting, we may turn to consider some recent work on the diseases of the several glands.

THYROID.

The chief real advances during the past year have been made in the study of disease of the thyroid gland. Investigation of the thyroid initiated the study of the endocrines, and still leads the way.

Hyperthyroidism.—The advances may be classified under three heads: (1) *The study of the basal metabolism*; (2) *The application of certain bio-chemical tests*; (3) *The study of the cardiovascular complications of Graves' disease.*

1. Determination of the Basal Metabolic Rate.—There is a general consensus of opinion that this method has proved of great value. The following description is taken from the account of C. M. and Dorothy Wilson.[6]

By basal metabolism is meant the amount of oxidation taking place in the body in the post-absorptive condition—that is, after twelve hours' fast—and at complete rest. It is measured by the rate of production of carbon dioxide from the oxygen inhaled, or by the heat produced.

The figure, taken in proportion to the body surface area, is constant for normal people of the same sex and age. A rise in basal metabolism is one of the most characteristic manifestations of thyroid over-activity. It gives us an exact measure of the toxicity of any particular case, and if the figure is ascertained at intervals, it tells whether that toxicity is increasing, is decreasing, or is remaining stationary. We are therefore able to follow the course of a case of Graves' disease on a chart precisely as we watch the temperature in pneumonia. Estimations of the basal metabolic rate are useful in the diagnosis both of hyper- and hypothyroidism, but it is in the treatment of these conditions that these measurements are particularly serviceable. For example, in the treatment of exophthalmic goitre, while we are dependent on rest and drugs, or on *x* rays, or on surgery—on one, or on more than one, of these measures—the choice of remedy has been hitherto determined partly by the safety and convenience of the method, and partly by the individual predilections of the physician or surgeon. Measurements of basal metabolism bring exact methods to the process of selection. They enable us to determine which of several methods of treatment is likely to prove effective in any one case, and to check the results of that particular method by following its effect upon a curve representing the basal metabolism taken from time to time, until it is apparent from the stationary readings that this method has brought about the full measure of alleviation of which it is capable. It is right and proper that surgical measures, with their increased risk to patients, should be held in reserve until a fair trial has been extended to rest and drugs, supplemented if need be by *x* rays. In this connection it is the advice of Means and Aub,[7] as the outcome of more than two years' work at the Massachusetts General Hospital, that if rest and drugs and *x* rays fail to restore the basal metabolism to within 20 per cent of the normal, then there is a plain call for surgery—unless there is some definite contra-indication such as a rising metabolic rate in spite of complete rest, when the surgeon's intervention is fraught with peril. Finally, these measurements enable us to detect the malady and the relapses of that malady after treatment at a stage when active measures will restore normal function.

Method of Determining Basal Metabolic Rate.—In clinical work the method of direct calorimetry is hardly applicable. The indirect method is used, for which four data are necessary: (i) The total volume of air expired in a given time; (ii) The average composition of the expired air—that is, the percentage of oxygen used and carbon dioxide given out in a measured time; (iii) The patient's weight; (iv) The patient's height.

In order that the figure obtained shall be a true measure of the basal metabolism, it is necessary for the patient to be at rest, not only during the test, but for some time before it, since any muscular activity increases the metabolic rate. As a routine, then, the patient upon whom the determination is to be made is kept lying on the back for at least half an hour before the test is begun. On the evening previous to the test no food is allowed after a light meal about 7 p.m., and the test is performed the following morning before breakfast.

A face-piece of the type used in mine-rescue apparatus, with a flexible framework and a rubber air-cushion rim, is fitted to the patient's face, and held firmly by tapes or by an assistant. The mask covers the nose and mouth and has two outlet pipes, each of which is fitted with a rubber valve, one for inlet and the other for outlet. It is advisable to give the face-piece to the patient on the day before the test is to be made, and allow her to get used to it by wearing it, otherwise results may be vitiated by nervousness. One of the first essentials of accurate results is that the patient should breathe quietly and naturally during the test. As a routine, in every new patient two determinations on consecutive days should be made. If the second result should be lower than the first, the test is repeated on the third day.

When the face-piece is adjusted, the outlet valve casing is attached to one end of a piece of flexible rubber tubing, the other end of which is firmly connected to the end of a three-way metal tap. This tap is firmly and permanently secured to a rubber-proofed Douglas bag. The tap is so arranged that the expired air can be directed into the room, when the bag is shut off, or into the bag, when the room is shut off. At first the bag is closed and the patient is allowed to breathe for some minutes until the respiration-rate and pulse-rate have settled down and become stable. The three-way tap is then turned so that the expired air goes into the bag, and the time is carefully noted. The patient breathes in this way for ten minutes, and the tap is then turned so that the bag is closed, and subsequently the expired air goes into the room. The time of the close of the experiment is carefully noted, and during the test the respirations and the pulse-rate are counted. The contents of the bag are then analyzed in the usual way with the Haldane gas-analysis apparatus. Duplicate analyses are made so as to diminish error, and the volume of air in the bag is measured by passing it through a meter. By adding to this figure the amount of air used in the analyses, the total volume of air expired in the time of the experiment is thus determined. For the calculation of results reference must be made to the original paper.

Various observers have laid stress on the diagnostic value of the method in distinguishing toxic from non-toxic goitre, in establishing or refuting suspicions of hypo- and hyperthyroidism, and in the differential diagnosis of early tuberculosis or purely nervous states from hyper hyroidism,

In this connection it is useful to note that Sturgis and Tompkins,[8] from a careful comparative study of pulse-rate and basal metabolism, concluded that a pulse-rate at complete rest below 90 per minute is seldom, and below 80 per minute is rarely, associated with an increase in metabolism. They found this to be of practical importance in the recognition of the large group of nervous patients who have symptoms similar to those occurring in hyperthyroidism.

It seems probable that the method may be applied to other metabolic diseases with advantage. When we find that Graves' disease may show a basal metabolic rate of 40 per cent or more above normal, while in myxœdema it may be equally lowered, we can realize the large part played by the thyroid gland in the conduct of metabolism. Adler's observations on the termination of hibernation in animals by injection of thyroid extract throws an interesting side light on this.

2. Biochemical Tests for Hyperthyroidism.—Here we are on more disputable ground. Five tests have been put forward.

i. *Loewi's Mydriasis Test.*—This was originally introduced as a test for pancreatic disease. If a drop of 1–1000 solution of adrenalin chloride is instilled into the conjunctival sac, and another five minutes later, the pupil will dilate within half an hour if the pancreas is inadequate. The test is based on the antagonism between the internal secretions of the pancreas and adrenals, which normally balance one another. But it was then found that excess of thyroid secretion, by sensitizing the sympathetic nerve-endings to adrenalin, caused this reaction to occur in the absence of any pancreatic defect. This test is of some value in the diagnosis of hyperthyroidism.

ii. *Goetsch's Test.*—This also depends on the sensitization to adrenalin by hyperthyroidism. Eight minims of the 1–1000 solution, diluted with an equal amount of sterile water, are injected hypodermically into the arm. Some observers prefer an intradermal injection. Immediately the arm around the point of injection blanches, and at the margin of this there is a red areola gradually shading off into the normal skin colour. In about half an hour the centre of the area becomes lilac or lavender in colour, and in from one and a half to two hours the red areola becomes lavender, while the central area fades. The lavender part of the areola is the characteristic part of the test, and lasts for about four hours after injection. The local reaction may be accompanied by increased symptoms of hyperthyroidism, such as tachycardia, a rise in systolic blood-pressure with a fall in the diastolic, exaggerated tremor, fear and anxiety. Golla describes a case in which the patient felt the sensations without the emotion of fear and distress after the injection. On mentioning a disagreeable topic, however, there was an outburst of emotionalism. The diagnostic value of this test is, however, doubtful. Peabody and others have found the reaction widely distributed among persons with no other evidence of hyperthyroidism. Harrower, on the other hand, believes it to be especially helpful in establishing a diagnosis in latent cases.

iii. *Glucose Tolerance Test.*—It is of considerable interest that several observers have noted a similarity between the increment in metabolic rate after the injection of small doses of adrenalin and that found by Lusk to attend a carbohydrate plethora. It accords with Cramer's observation that the increased heat production in fever is brought about by the oxidation of the sugar with which the increased secretion of the thyroid and adrenals floods the blood. Incidentally it throws doubt on the diagnostic value of Goetsch's test if hyperthyroidism and fever have such similar effects on metabolism. It has long been known that sugar tolerance is lowered in hyperthyroidism; but the study of the curve of the sugar in the blood after a dose of 50 grm. of dextrose is a more delicate method. In the normal individual this will produce a rise of blood-sugar to about 0·14 per cent, which quickly subsides in about an hour. In hyperthyroidism the rise is greater and considerably more prolonged, while actual glycosuria may result. In one such case under my care of hyperglycæmia without glycosuria, sugar subsequently appeared in the urine on an ordinary diet following an emotional strain. I am inclined to attribute considerable importance to the curve of hyperglycæmia in Graves' disease, especially in prognosis.

iv. *Thyroid Function Test.*—This, as Harrower[9] says, is obviously not a measure to be used in frank hyperthyroidism. The first day ½ gr. of thyroid extract is given, the second 1 gr., and the third 2 gr., at 8, 10, 12, and 2 o'clock. The pulse is taken five times at regular intervals (9, 12, 3, 6, and 9 o'clock) for one day preceding the test, during the three days of the test, and for two days following its discontinuance. If the thyroid is irritable, the pulse will show an early rise, and will continue to be rapid for two or more days following the test ; a normal thyroid will only show a slight fleeting increase in rate ; while the underactive gland pays but little attention, and little or no change is observed. There is no doubt as to the efficacy of the test, but its advisability is more questionable. It is most applicable to cases where thyroid enlargement may be compensatory, in which event the symptoms will be ameliorated and not aggravated by the test. It is still too commonly the practice to give thyroid extract in Graves' disease, no doubt on the view that it is a dysthyroidism rather than a hyperthyroidism. That small doses of thyroid may help in the condition of thyroid instability described by Leopold, Levi, and Rothschild—a condition of 'irritable weakness'—is true, but in real hyperthyroidism the effect may be disastrous.

v. *Quinine Hydrobromide Test.*—Since McCarrison recommended this drug for Graves' disease, many observers have borne testimony to its great usefulness. Bram,[10] of Philadelphia, has made use of the fact that patients with Graves' disease are more tolerant of the drug than normal individuals. He gives a 10-gr. capsule of the neutral hydrobromide of quinine, with an ample draught of lukewarm water, three times a day. Cinchonism develops in a normal individual by the time 30 to 50 gr. have been taken, while the subjects of hyperthyroidism can continue to take such a dose even for weeks or months without toxic effect and with benefit to the symptoms of the disease. In passing, I may remark that while I believe quinine hydrobromide is the most valuable drug we have for the treatment of hyperthyroidism, it is not always well tolerated by women. Though it has generally been regarded as having a sedative effect on the sympathetic nervous system, Ford Morris attributes its success to a vasoconstrictor action, which appears doubtful.

Dealing with the diagnosis of hyperthyroidism by the aid of these tests, Fussell[11] points out that neurasthenic conditions can be distinguished from it by the following points—the neurasthenic usually has a loss of appetite, does not react to thyroid feeding, and does not show an increased metabolic rate, while Goetsch's test is negative, and the sugar tolerance is normal. In the irritable heart of soldiers he finds no reaction to thyroid feeding nor increased metabolic rate, while Goetsch's test is positive in 60 per cent, but sugar tolerance is rarely affected. Goetsch maintains that his test is negative in early tuberculosis, unless there is complicating hyperthyroidism. Plummer states that while a simple hypertrophic goitre exists on an average for fourteen and a half years before developing toxic symptoms, Graves' disease shows them in not more than eleven months.

3. The Cardiovascular Complications of Graves' Disease.—The sequence of events in the heart is considered by Goodall[12] to be as follows : The tachycardia, when prolonged and severe, produces myocardial exhaustion and atony. This leads to dilatation, with consequent valvular incompetence. Ultimately myocardial degeneration follows, which may result in auricular fibrillation. The frequency and grave significance of auricular fibrillation in mitral stenosis has long been recognized, but it is only recently that its impor-

tance as a factor in the breakdown in Graves' disease has been appreciated. Indeed, it is probable that the extension of the fibrillation to the ventricle is sometimes the cause of sudden death after operation for this condition.

The vexed question of the blood-pressure in Graves' disease has also been studied by Goodall and Rogers.[13] Incidentally it may be noted that they calculate the physiological blood-pressure from the formula B.P. = age + 100 — 5 per cent, whereas Faught's method of taking the pressure as 120 at 20 years of age, and adding 1 mm. for every two years over this probably gives a rather more accurate figure. They describe three stages :—

i. *A Preliminary Stage of Hypertension.*—This is relatively short, associated with the onset of the disease, and is probably due to peripheral vasoconstriction induced by the action of the exciting stimulus on the suprarenal. It is most easily demonstrated in cases that come after shock, acute anxiety, or fright.

ii. *A Stage of Hypotension.*—This is relatively long, lasting for months or even years. The blood-pressure is below the physiological value, the lowered tension being due to vasodilatation induced by a depressor substance secreted by the hyperactive thyroid. It is during this stage that the majority of patients seek advice. It may be regarded as the safe operation stage. The heart is usually soft, atonic, and more or less dilated, with reflux at one or perhaps both auriculoventricular valves.

iii. *A Stage of Secondary Hypertension.*—This is a period of gradually rising pressure which succeeds the second stage after a varying length of time, usually some years, and appears to be associated with two conditions, namely : (*a*) A reduction of the excessive thyroid activity, with a consequent relative increase in that of the suprarenal ; (*b*) Some secondary change in the cardiovascular system, such as cardiac hypertrophy.

In each phase, and particularly in the second, diurnal variations are considerable. After operation an immediate and definite but temporary rise in blood-pressure occurs, which may reach double the pressure before operation. The effect of this in greatly increasing the work of an already partly exhausted myocardium, and perhaps inducing ventricular fibrillation, must be borne in mind in considering operation. Routine study of blood-pressure has proved of great value in the selection of suitable cases for operation.

Several other interesting observations have been made during the year. G. R. Murray[3] has called attention to the persistent sense of fatigue as one of the earliest symptoms of Graves' disease, a point which I find careful inquiry into the history will often elicit ; and he has laid stress on the value of routine examination by inspection, palpation, percussion, and auscultation of the thyroid gland.

Etiology.—Kaplan[14] regards Graves' disease as essentially female in incidence, and states that male patients nearly always show some physical traits of feminism.

Adopting McCarrison's classification of the influences leading to hyperthyroidism as nutritional, psychic, and toxic, there is nothing fresh to report under the first heading. With regard to the second, Roussy and Cornil[15] are opposed to the idea of emotion as a cause of exophthalmic goitre, believing that it is the 'formes frustes' that have led to this opinion. They believe it to be due to a primary disease of the thyroid and thymus, with a particular type of histological lesion. In this connection may be mentioned Goetsch's attribution of mild hyperthyroidism to a "diffuse adenomatosis with increase of interstitial 'fœtal cells'". Rogers reports that there was no case of Graves' disease after the Jutland or other naval battles. It is quite possible there has been a tendency to overestimate the psychic factor in consequence of the large number of 'formes frustes' seen both in the army and among the civilian population exposed to air raids. It may be urged that everyone suffered from war strain in one form or another, while comparatively few developed hyperthyroidism. McCarrison stated, however, that the disease is particularly liable to occur when more than one of the three factors are at work, and it will often be found that there is a combination of toxic and psychic causes. Pfeiffer is convinced that every case of exophthalmic goitre of so-called emotional origin occurs on a syphilitic soil. This is opposed to my experience, and I think to that of most other observers; but there is a general consensus of opinion as to the importance of sepsis, particularly oral or tonsillar, and of intestinal toxæmia, in its etiology. This is comprehensible now that we know how the thyroid and adrenals react to infections, and that the active principle of the former is an indol compound. I recently saw a patient who had had the right lobe of his thyroid removed by Kocher in 1908, and three separate operations performed subsequently for ligature of the arteries on the other side. Yet he still had active Graves' disease, with auricular fibrillation. On looking at his mouth I found he had a bridge right across the front of his upper jaw. The gums were leaden in hue, and a skiagram revealed extensive absorption of bone. There could be no doubt of the existence of grave oral sepsis, all the more dangerous because of the rigid metal case in which it was enclosed. It was, however, impossible to convince him of the significance of this. But when every allowance has been made for the great importance of sepsis, I am each year more strongly inclined to agree with Crile, when he says: "I have never known a case of Graves' disease to be caused by success or happiness alone, or by hard physical labour unattended by psychic strain, or to be the result of energy voluntarily discharged." And further knowledge of a case has often revealed a cause of emotional conflict previously unsuspected.

TREATMENT.—Medical treatment of Graves' disease may be summed up as physical and mental **Rest**, in the widest sense, with elimination of all toxic factors as far as possible, administration of **Quinine Hydrobromide**, and attention to symptoms as they arise. There has been a marked revival of interest in its surgical treatment, but this is the subject of a separate article (*see* THYROID SURGERY). Suffice it to say here that the earlier and more efficient the medical treatment, the less should the services of the surgeon be required. Cannon has shown that simple sympathetic stimulation can produce enlargement of the thyroid. Since thyroid secretion lowers the threshold to sympathetic stimulation, a vicious circle is set up. Direct diminution of thyroid secretion by operation or irradiation aims at breaking this vicious circle. Barker,[16] describing the **X-ray Treatment** of the gland, holds that this should not be used for simple goitre or adenomatous enlargement, because it acts first on the secreting cell, and will cause hyperthyroidism before reducing the tumour. On the other hand, he warmly advocates it for Graves' disease. His method is to use 5 ma. of current through a Coolidge tube for three minutes, the resistance being equal to a 10-in. spark measured between points, the rays being filtered through 3 mm. of aluminium. The anode is placed 8 in. from the skin, the dose given through each area, and the treatment repeated every four weeks. He finds that the subjective symptoms are the first to be relieved. The patient begins to feel less nervous, has less palpitation, sleeps better, and is less irritable and tired. The first of the objective signs to improve is the tachycardia. When the patient feels better the interval between the doses is increased to six weeks, and finally to eight. If there is any return of the symptoms the interval may be shortened. Probably 6 to 8 doses will be required at four-week intervals, which are then lengthened to from eight to twelve weeks, and the patient is kept under observation for about a year. He does not mention the risk of producing telangiectases, which certainly exists. Aikens[17] advocates the advantages of treatment by **Radium**, screened to prevent the beta rays getting through, but allowing the gamma rays to penetrate. The dosage he uses is 150 to 360 mgrm.-hours for the first treatment, and 50 to 150 mgrm.-hours subsequently. Hoppe[18] reports improvement of Graves' disease by **Extract of Corpus Luteum**, particularly the cardiovascular symptoms. This is difficult to understand in view of the stimulating effect of pregnancy on the thyroid. Further, it has been stated that none of the preparations of corpus luteum on the market can be proved to be active.

Hypothyroidism.—Here there is little fresh to record. At the same time, my experience is that minor degrees of this condition are so often overlooked, that it is worth while to call attention to Hertoghe's observations on the subject in the hope that they may help others as they have helped me. He pointed out that the thyroid both governed the building up of the cells and regulated the destruction of the protein molecule and its elimination. Therefore, with thyroid insufficiency there will be defective growth, which will be most noticeable in the young subject ; while in the adult there will be accumulation of material which should be katabolized. He attributes to a minor degree of thyroid insufficiency such symptoms as those following the relaxation of the articular ligaments, particularly in the knee, heel, ankle, and thoracic vertebræ, causing knock-knee, painful heel, flat-foot, and lordosis. Infiltration of tendons and fasciæ may produce rheumatoid pains. He attaches considerable importance to the disappearance of hair from the outer half of the eyebrow. Enuresis he believes to be frequently due to the same cause. Thyroid inadequacy diminishes the coagulability of the blood, which explains the tendency to hæmorrhage. Infiltration of the nerve centres causes mental slowness, partial or entire loss of memory, and difficulty in expressing ideas. Sometimes there are hallucinations of sight and hearing. Headache, giddiness, and somnolence are not uncommon. The liability of myxœdematous subjects to develop atheroma suggests the use of thyroid extract in premature arterial degeneration.

Kaplan[19] sums up the rôle of the thyroid as the chief equilibrizer of the human organism, particularly maintaining equipoise between the endocrines ; while McCarrison says briefly : "The thyroid gland is to the human body what the draught is to the fire."

PARATHYROIDS.

The function of the parathyroids is still a matter of dispute. It will be remembered that as long ago as 1907 Forsyth concluded after careful study that the parathyroids are portions of the main thyroid gland which have not yet formed vesicles ; that all the intermediate stages between thyroid and parathyroid tissues occur : and that they were essentially similar in function. Berry[20] states that though he has removed goitres 1338 times, he has never seen tetany develop, although he takes no special care to avoid the parathyroids. He admits that as he leaves a piece of gland at the hilus he may have preserved some of them, but confesses himself still an impenitent sceptic as to the supposed separate function of the parathyroids. On the other hand, Noel Paton and Findley,[21] in 1916, observed muscular spasms and tremors after experimental removal of the parathyroids with the thyroid in animals. Tetany has been ascribed to diminished calcium fixation due to parathyroid loss, the calcium being sedative to the nervous system. But it has been observed by Noel Paton that when the parathyroids are removed guanidine accumulates in the body, and he believes this to be the cause of tetany, since a similar effect is produced by the injection of guanidine. Turning to the clinical evidence, Hurst in 1915 reported a remarkable case of fibrillary twitchings, tremors, restlessness, and diarrhœa coming on two years after removal of the greater portion of the thyroid, which was aggravated by thyroid extract but greatly benefited by gr. $\frac{1}{10}$ of parathyroid extract four times a day. Cordier[22] describes the case of a man, age 41, who suffered from tetany and diarrhœa among other symptoms as the result of hæmorrhages into the right and left parathyroids. In the earlier stages administration of fresh parathyroid gland distinctly improved the symptoms, but when a second hæmorrhage occurred this treatment failed. G. H. Clark[23] describes fully three cases in children with the following outstanding symptoms: idiocy, depression, fibrillary twitchings in the muscles, jerking movements of the limbs, convulsions, and inability to balance. Struck with the resemblance to the condition produced in animals by removal of the parathyroids, he treated them with parathyroid extract, with remarkable benefit. On discontinuing the drug the symptoms returned, on two occasions in one case. In view of these striking clinical facts we must not hastily conclude that the parathyroids have no separate function.

ADRENALS.

While the medulla is an outgrowth of the sympathetic nervous system, the cortex is developed from the Wolffian body, which also provides the interstitial cells of the reproductive glands. Conformably with their origin, disturbances of the medulla chiefly affect the sympathetic nervous system, and of the cortex the reproductive system. The influence of tumours of the adrenal cortex in producing premature sexual development is an example of the latter.

But what may be the meaning of the coalescence of the originally separate medulla and cortex is not yet clear. That it has some evolutionary advantage is shown by the way that this arrangement is arrived at and adhered to by vertebrates above the level of fishes. They are presumably interdependent in some way, and Cramer believes that the cortex plays a part in the preliminary stages of elaborating the medullary secretion.

It is unnecessary to refer in detail to Addison's disease, the classical type of hypo-adrenalinism. But some interesting observations have been made on the possibility of the pigmentation in this condition being compensatory for defective secretion by the medulla. Hitherto one has been inclined to accept Rendle Short's view that this pigmentation is secondary to the relaxation of the blood-vessels due to diminished vasoconstriction, just as occurs over an area repeatedly poulticed, or exposed to increased light, heat, or irritation. The pigmented epidermal cells of the water-toad are known to produce a pressor amine, and more recently a similar substance has been isolated from the pigmented areas of skin in hypo-adrenalinism. This is very suggestive of a compensatory mechanism (Kaplan[14]). I have certainly noted a rapid increase of these cells in asthenic states; but in one such case recently under my care, no chromaffin could be found in these areas, which was removed and examined microscopically. That in such states there is hypo-adrenalinism is probable, in view of the strain thrown upon the sympathetic endocrine system in responding to prolonged mental and physical strain, or to infection. It has been suggested that adrenalin exhaustion enters into many war neuroses and other functional states characterized by lack of vascular tone, vasomotor instability, myasthenia, and low blood-pressure.

Sergent, in 1917, called attention to the 'white line' as a test for the recognition of such minor degrees of hypo-adrenalinism. This line is a blanching of the skin following light stroking by a blunt object such as the back of the finger-nail or the eraser at the end of a pencil. The subject assumes the recumbent position, with abdomen exposed for at least twenty minutes, and then a figure such as a triangle or rectangle is stroked lightly on the skin of the upper abdomen. Shading the part from bright light aids in the perception of the line. In about ten seconds a pure white band, varying in intensity, and unmixed with any element of red, appears, which lasts from three to fifteen or more minutes. But Kay and Brock[24] conclude that it has not the clinical significance attributed to it, because of: (*a*) Its independence of blood-pressure, acute fatigue, and other signs of hypo-adrenia; (*b*) Its frequent occurrence in normal subjects and in a variety of diseases unassociated with hypo-adrenia; (*c*) Its reappearance in the face of persistent general manifestations of adrenalin subcutaneously administered; (*d*) Its peculiar association with scarlet fever.

It is somewhat surprising, in view of the identical effects produced by injection of adrenalin and stimulation of the sympathetic, to find that Stewart and Rogoff's[25] careful series of experiments leads them to conclude that adrenalin is steadily secreted under nervous action controlled from a spinal centre, which is not specially brought into play by emotional stresses and physical strains, and that it is not essential to the organism. These conclusions are opposed so diametrically to the results of others, that one cannot help thinking that further observations will supply some reconciliation between them.

The association between the cortex of the adrenal and the cerebral hemispheres has already been referred to. Little has been added to our knowledge of the association between growths of the cortex and premature sexual maturity. But it is important to observe that when adult women have tumours or hypertrophy of the cortex, they show a marked tendency to virilism. Mauclaire,[26] who reports a case, quotes 30 examples collected by Apert in 1910.

Kaplan[27] regards the adrenal system as the chief source of energy, the seat of Crile's kinetic drive, with the additional function of supervising the colour of the hair, its distribution, and its time of appearance, together with the complexion.

PITUITARY.

After the rapid advances made in our knowledge of this gland a few years ago, mainly through the researches of Cushing, the past year seems to have called a halt. I recently summarized the present state of our information as follows:[28] The pituitary body also shows the two-fold association with the reproductive organs and the sympathetic nervous system. Like the adrenals it has a double origin, a glandular portion growing up from the epithelium of the buccal cavity, partly surrounding an outgrowth from the central nervous system. In both cases it is the nervous part which produces a well-recognized secretion. The anterior glandular part of the pituitary appears to have an effect on body temperature, growth, the cutaneous tissues, and the reproductive organs. Removal or disease of this lobe leads to a subnormal temperature, and an injection of its extract then causes a febrile reaction, a point of diagnostic value. If the anterior lobe be removed in young animals, the development of both primary and secondary sexual characters is much interfered with, while that infantile gland, the thymus, remains large. In human beings over-secretion shows itself, as in acromegaly, by overgrowth of the skeleton and the skin, and hypertrichosis; while under-secretion leads to a smooth, hairless, plump condition of the skin, with amenorrhœa or impotence.

I am sure that minor degrees of hypopituitarism of this type are not uncommon. The condition of the skin and subcutaneous tissues recalls myxœdema, but the mental state remains active. The obesity is very marked. A curious point, to which I have not seen attention called, is the frequent occurrence of polycythæmia. I believe that adiposis dolorosa is a related condition, and I recently saw an example of this affection in which a skiagram showed an enlargement of the pituitary fossa, into which the anterior clinoid process dipped down.

The intermediate part of the gland, though closely adherent to the posterior, is derived from the anterior lobe. It influences carbohydrate metabolism. In excess, its secretion lowers sugar tolerance, and may excite glycosuria : when it is in defect, giving even very large amounts of sugar will not cause glycosuria.

The secretion of the posterior lobe, pituitrin, is mainly a stimulant to plain muscle, and also to the secretion of milk. Its action on plain muscle is better seen in an emergency than under normal conditions. Thus it does not usually influence a normal blood-pressure, but raises it when lowered by shock ; it acts on a failing heart, but not on a normal one ; it has little effect on the plain muscle of the bowel, except when paralyzed, as in post-operative conditions ; it does not cause contractions of the uterus until after labour has begun and inertia is present. The way it acts on diuresis is still a matter of controversy, but it is clear that disease of the posterior lobe is often the cause of diabetes insipidus. (I might add that my own opinion leans to the view that diabetes insipidus is most frequently due to defective action of the posterior lobe, since the polyuria can generally be controlled by injection of pituitrin.) Stimulation of the sympathetic nerves to the gland may also cause both glycosuria and polyuria. Probably hysterical polyuria is thus produced. But the reciprocal action of the gland on the sympathetic is not so clearly seen as in the adrenals and thyroid, unless the examples quoted above may be taken as instances. Like the thyroid, it enlarges in pregnancy, producing a curious and characteristic effect on the facies. The glycosuria of pregnancy is no doubt due to its stimulating effect both on the thyroid and pituitary.

Kaplan summarizes the functions of the gland thus : The pituitary dominates dimension, including the size of the individual as well as of the individual parts of the human structure ; it also supervises occurrences that have a rhythmic or periodic quality.

Although pituitary extract is not absorbed from the alimentary tract so easily and certainly as thyroid extract, Hamill has been able definitely to prove that it can be so absorbed. This materially simplifies its use in organotherapy.

Some of the main functions of this katabolic group of endocrine glands which interact with the sympathetic may be expressed in tabular form thus :—

Gland	Sex	Growth	Vasomotor System	Glycosuria
Thyroid ..	+	+	Dilator	+
Adrenals—				
Cortex ..	+	+	o	o
Medulla ..	o	o	Constrictor	+
Pituitary—				
Anterior ..	+	+	o	o
Intermediate	o	o	o	+
Posterior ..	Galactagogue	o	Constrictor	o

It is interesting to note that these glands have a different effect on secondary sexual characters. Thus hyperthyroidism tends to femininism, while hyperpituitarism tends to virilism. Hypopituitarism in men produces certain feminine traits, while it has already been pointed out that increased action of the adrenal cortex leads to well-marked virilism in women.

THYMUS.

The rôle of this gland is normally limited to the infantile period. With the development of the gonads its activity ceases. As Kaplan says: "Should the gonads come in relatively late, you will be confronted by an overgrown child; should they come in too early, you will have a precocious child." How the antagonism between these glands expresses itself is hard to say, since there is as yet no evidence of an internal secretion formed by the thymus. It is interesting to note that in Graves' disease, a condition usually confined to the years between puberty and the menopause, there is almost always an enlargement of the thymus, especially of its Hassall's corpuscles, which may possibly be of a compensatory character. In this connection it may be mentioned that Jacoby[29] claims that thymus extract is helpful in the treatment of menorrhagia.

The acquisition of the adult blood-picture and the disappearance of the thymus are generally simultaneous. Before that date lymphocytosis is a characteristic blood reaction, and it is doubtful whether the condition known as pseudoleukæmia or splenic anæmia of infants can be produced after that time. This condition is probably simply the reaction of infantile blood to various severe toxæmias. Enlargement of the thymus in status lymphaticus is usually only a part of the general adenoid enlargement. It is tempting to regard this as part of an abnormally sensitive reaction to foreign proteins, such as is usual in those whose vagus response is increased. This would account for the liability of sufferers from status lymphaticus to paroxysmal dyspnœa, syncope, and anaphylactic shock. Their extreme vulnerability is shown by their liability to sudden death from trivial causes. No doubt a contributory factor in this is the hypoplasia of the heart, which appears unable to develop properly under the cover of an enlarged thymus.

PINEAL.

Overgrowth of this body produces the usual localizing effects of a midbrain tumour. Its function would appear, like the thymus, to be chiefly confined to the infantile period, and defect in its activity, as already stated, is accompanied by premature sexual maturity. Whether this is a direct effect, or whether, as Llewellys Barker suggests, it may depend on neural disturbance of more distant endocrine glands, cannot be decided yet. Recent observations suggest that disease of the pineal body may play a part in the production of muscular dystrophy. Brock and Kay[30] have investigated three cases most thoroughly. In a case of myotonia congenita a suspicious shadow was shown by *x* rays in the position of the pineal body, but in all there would appear to have been disturbance of more than one endocrine gland. In some reported instances the pituitary fossa appeared abnormal. In one case of Erb's dystrophy under my care, the fossa seemed to be invaded by spicules of bone; while in another case of Erb's type, and one of the pseudohypertrophic type, the fossa was normal. In none of these cases did *x* rays reveal anything abnormal in the pineal body. But by no means every abnormality of these glands would be revealed in this way, and their careful histological study in muscular dystrophies is needed.

THE GONADS.

I do not propose to discuss the newer work, such as Steinach's, on this subject ; it has not yet had time to find its level. As to the part the gonads play in the endocrine system, I may summarize the conclusions reached by Blair Bell in his book *The Sex-Complex*, of which the second edition has recently appeared. The internal secretion of the ovary is probably concerned in keeping the other members of the endocrine system in touch with the necessities of the reproductive situation ; its influence on metabolism may produce effects on the activity of other organs of internal secretion. The ovary, then, is concerned with the temporary function of reproducing the species and, by its hormones, of bending the metabolism of the body to this purpose. Bell does not believe that it influences general metabolism in any other way, but I assume that he would admit that this influence on metabolism might be principally exercised through the ductless glands. Certainly he admits the converse—that the thyroid, pituitary, and adrenals influence the development and activity of the reproductive organs, while the pineal and the thymus restrain them. Also that all the endocrine glands acting in harmony control metabolism in accordance with the needs of reproduction, and, in addition, adapt the whole organism to the possibilities of the situation and regulate the secondary characteristics, both physical and psychical, to the needs of the individual. With the removal or atrophy of the gonads, the reproductive aspects of the rest of the internal secretory system cease, and the rearrangement of the metabolism that follows produces the symptoms of the climacteric. On the other hand, insufficiency of the thyroid, pituitary, or adrenals may cause the cessation of reproductive functions. Bell believes that this is a correct general statement, although much detail remains to be filled in. With this I should agree, adding that, *mutatis mutandis*, it applies to the male.

Several observers, such as Smith Jelliffe and Kaplan, have called attention to the association between mal-development of the upper lateral incisors and gonadal inadequacy. I have noted that in such cases there may be more than the usual enlargement of the thyroid at puberty, as if an unusual difficulty were then experienced in establishing an endocrine balance. But it is further interesting to recall that the lateral incisor is the one involved in cleft palate, and that its mal-development is regarded by several authorities as a 'forme fruste' of this condition. It is, in effect, an atavistic feature, a symptom which tells of the difficulty in the way of complete development.

PLURIGLANDULAR SYNDROMES.

Although we recognize that one endocrine gland seldom suffers alone, we are not yet in a position to formulate any definite laws as to pluriglandular syndromes. I think it would be generally admitted, however, that the katabolic group of thyroid, pituitary, and adrenals interact with the sympathetic nervous system and the gonads, and tend to suffer together in the same direction, though this does not exclude compensatory hypertrophy of the other members of the group to try and make good a default on the part of one. Further, their general antagonism to the pancreas in regard to metabolism, and to the thymus and pineal in regard to adolescence, would be admitted by most observers. Beyond this it is hardly safe to go until our knowledge of the individual glands is more complete. Some, indeed, would boldly maintain that they cannot conceive of positive symptoms being due to a defect, but rather that these were due to consequent uncontrolled action of the antagonists.

Probably the work of the next few years will make many such debatable points clear. It must suffice if, in conclusion, I give[28] my present views on the general principles of internal secretion.

GENERAL PRINCIPLES OF INTERNAL SECRETION.

To get a general conception of these principles, it is necessary to start from the premiss that the development of each individual recapitulates, briefly and with modifications, the history of the race. And it is helpful to remember that while life has been present on the earth for millions of years, man did not appear more than a comparatively few thousand years ago. Every time an individual repeats the history of the race he does it more easily as the result of practice. Thus it happens that the fœtus in nine short months of pre-natal life recapitulates the history of millions of years, while his longer infantile life only repeats the history of a few thousand years. That even an adult may speedily revert to the instincts and habits of a cave man the war has abundantly shown. Later veneers of civilization are easily cast aside.

Now the most primitive forms of life multiplied by simple fission. The unfertilized ovum is the nearest approach to the primordial cell that we know. Like the primordial cell it starts to divide by simple fission, forming two polar bodies. Millions of years ago simple fission was found inadequate for a complex animal, yet every ovum starts on this course till it is abruptly brought up by the consequent exhaustion of its powers of growth. But when fertilization has remade its nuclear network, a tremendous impetus is given to growth. When growth is expressed as a fractional increase of body-weight, it will be found that its curve continuously diminishes from fertilization onwards. In other words, the impetus thus derived gradually wears itself out. A new life may be compared to a projectile travelling with a constantly diminishing velocity. But unlike an ordinary projectile it is supplied with intrinsic regulators, capable of increasing or diminishing its velocity. These regulators are the two groups of endocrine glands and their associated nervous mechanisms. In the first few years of life the original impetus is so enormous that a brake is needed—which seems to act through the thymus. By seven years of age this brake is needed no longer, and should it continue to be applied from any cause, infantile features persist. With the aid particularly of the thyroid and pituitary, active growth continues until puberty gives another twist to the mechanism from the active development of another set of glands—a new position of equilibrium has to be found. With adult years a part of the energy is diverted from growth of the individual to providing a supply for the next generation; and again the regulators have to provide a new adjustment. Another jolt—often a violent one—is given to the mechanism by the climacteric, and yet a new position of equilibrium has to be acquired. From this point on, the dying down of the initial velocity is marked; the accelerating thyroid seems to die down before the sedative parathyroid—calcium fixation goes on unchecked, therefore; the intercostal cartilages grow rigid; the chest becomes emphysematous, greatly diminishing the bodily activities by restricting respiratory exchange; the arteries become calcareous, diminishing the blood-flow to every part of the body; while childish and even infantile characters may reappear as the organism slows down for the terminus.

This may be considered the normal course of events. That everybody should ultimately only die from senile decay is the goal of medicine. But apart from violent death, the regulators may become worn out, with consequent great increase of friction to the mechanism. Invasion by bacteria and their toxins may prematurely exhaust the endocrine glands, or endogenous poisons may produce a similar effect; metabolism becomes balanced on a razor edge, the sport of every wind that blows. Nervous shocks and strains excite a reaction of the sympathetic nervous system, and, through it, of its associated chain of endocrine glands, with consequent exhaustion of them. And these two sources of endocrine exhaustion may interact, so that a psychic conflict may be produced because the body cannot adjust itself to a difficult environment largely because of an endocrine deficiency. Thus the two newest methods in medicine, psychotherapy and endocrinology, become not opposed but different aspects of the same problem. Or a body may start out ill-equipped with a supply of endocrines, so that its growth curve suffers a steep descent, as in the rare condition progeria, where senility comes on in childhood and the patient dies "an enfeebled old dotard of five". In dementia præcox we probably have a mixture of such causes at work: an atavistic reversion in bodily structure, as shown by monkey-like hands; a gonadal deficiency, with a consequent persistence of an infantile outlook; hence a total failure of adjustment to the conditions of adult life; the mind defensively withdraws itself from its environment, and consequently undergoes rapid involution.

References.—[1]*Brit. Med. Jour.* 1921, i, 821; [2]*Trans. Chem. Soc.* 1916, cix, 629; [3]*Brit. Med. Jour.* 1920, ii, 807; [4]*Report of Imperial Cancer Research Fund,* 1920; [5]*Amer. Jour. Med. Sci.* 1920, clx, 358: [6]*Lancet,* 1920, ii, 1024; [7]*Arch. of Internal Med.* 1919, xxiv, 645: [8]*Ibid.* 1920, 476; [9]*Med. Record,* 1921, April 16, 645; [10]Quoted by Harrower, *Ibid.*: [11]*N.Y. Med. Jour.* 1920, cxii, 208: [12]*Practitioner,* 1920, cv, 37: [13]*Brit. Med. Jour.* 1920, ii, 588; [14]*N.Y. Med. Jour.* 1921, April 20, 593; [15]*Presse méd.* 1920, Oct. 25, 753; [16]*N.Y. Med. Jour.* 1921, Feb. 12, 273: [17]*Canad. Pract. and Rev.* 1920, xiv, 329; [18]*Jour. Nerv. and Ment. Dis.* 1918, xlvii, 252; [19]*N.Y. Med. Jour.* 1921, Feb. 5, 227; [20]*Brit. Jour. Surg.* 1921, viii, 451; [21]*Quart. Jour. Exper. Physiol.* 1916, x: [22]*Ann. de Méd.* 1920, vii, 346; [23]*Glasgow Med. Jour.* 1920, Oct., 193; [24]*Amer. Jour. Med. Sci.* 1921, April, 555; [25]*Amer. Jour. Physiol.* 1917, xliv, 149–543; [26]*Bull. de l'Acad. de Méd.* 1920, Series iii, lxxxiv, 57: [27]*N.Y. Med. Jour.* 1921, Feb. 5, 227; [28]*Brit. Med. Jour.* 1920, ii, 688; [29]*N.Y. Med. Jour.* 1921, Feb. 5, 243; [30]*Arch. of Internal Med.* 1921, xxvii, 1.

ENDOPSYCHISM. (*See* Psychological Medicine.)

ENDOSCOPY, PERORAL.

A. J. M. Wright, M.B., F.R.C.S.

Foreign Bodies.—An exhaustive article by Chevalier Jackson[1] gives us what must be regarded as the most important account of the symptomatology up to date. Symptoms are classified according to the situation of the foreign body in larynx, trachea, bronchus, œsophagus, or stomach.

Larynx.—Foreign bodies when lodged cause an initial spasm which is followed by more or less laryngeal wheezing, croupy cough, and a variable degree of impairment of phonation. Pain in the laryngeal region may be present, and is sometimes referred to the ears. The larynx may tolerate a thin, flat, foreign body for a relatively long time, but the development of increasing dyspnœa renders removal imperative.

Trachea.—Tracheal foreign bodies are usually movable and the patient can feel them move. The vibrations can be palpated and heard by the examiner. Cough is present at once, may disappear and recur, or be continuous and violent. The sudden shutting off of the expiratory blast and phonation during paroxysmal cough is typical. Dyspnœa and the asthmatoid wheeze (Medical Annual, 1920, p. 69) are usually present. Pain is unusual.

Bronchi.—Initial laryngeal spasm is almost invariably present with organic foreign bodies. A diffuse purulent laryngo-tracheo-bronchitis develops within twenty-four hours in infants under two years old. Fever, toxæmia, cyanosis, dyspnœa, and paroxysmal cough are shown early. Lung abscess rapidly forms. In the early stages an acute obstructive emphysema is shown by: (*a*) Limited expansion; (*b*) Muffled tympanitic percussion note; (*c*) Markedly diminished breath-sounds on the obstructed side ; (*d*) Râles and harsh breathing on the free side. The radiograph confirms these signs by showing : (*a*) Greater transparency on obstructed side ; (*b*) Displacement of heart towards free side ; and (*c*) Depression and limitation of movement of diaphragm on obstructed side.

Where the foreign body has been present for a prolonged period the case presents the following features : The time of inhalation is often unknown. Cough and purulent expectoration occur after a variable interval. Periodic attacks of fever with increased coughing and expulsion of large amounts of purulent offensive sputum are very suggestive. Emaciation, clubbing of fingers, night-sweats, and hæmoptysis all simulate pulmonary tuberculosis, but tubercle bacilli have never been found in association with a foreign body.

Pain may enable the patient to localize the foreign body. Sudden complete obstruction of one main bronchus does not cause noticeable dyspnœa, but is followed by an early onset of symptoms. The pleura is rarely involved. The physical signs usually show limitation of expansion, impairment of percussion note, and diminished breath-sounds on the affected side. The asthmatoid wheeze, when present, is of great diagnostic value. All cases of doubtful chest disease should be carefully examined with the *x* rays, particularly if the symptoms date from within a few weeks of the extraction of teeth.

Œsophagus.—There is no absolutely diagnostic symptom. Dysphagia is usual but variable in degree. Pain is usually due to injury of the œsophageal wall. The subjective sensation of a foreign body is misleading, as it often persists when the foreign body has gone. The swallowing of a barium capsule, and examination with *x*-ray screen, will often locate a non-opaque foreign body.

Stomach.—Foreign bodies usually produce no symptoms, and as a rule may be safely left to pass on. That it is essential to keep a watchful eye, however, on cases in which a foreign body is located in the stomach is shown by two cases related by Jackson.[2] In one, two linked safety-pins were safely removed through the mouth by gastroscopy from the stomach of an infant, age six months. They had remained in the stomach for nearly a month, their size apparently preventing egress through the pylorus. In the second case an open safety-pin, after remaining in the stomach for seven weeks, was regurgitated and impacted in the œsophagus. The general principle on which these cases should be treated are : (1) Frequent *x*-ray examinations, and investigation of the stools during a watchful period, if necessary extending over some weeks ; (2) During this period no change in diet and no aperients ; (3) Should the foreign body not pass, it should be removed by gastroscopy if available, or by external operation.

TECHNIQUE.—The number of various types of instruments in use for endoscopic work proves that perfection is not yet reached. Two additions seem to be worthy of note, as they would seem, on theoretical grounds, to surmount some of the objections to those at present in use. Goodloe[3] has designed a combined bronchoscopic tube and forceps. It has only one thin jaw, which can be passed over the object and then flexed, thus working the foreign body up against or into the end of the bronchoscopic tube according to its size. Some of the advantages claimed are that vision is not obstructed by the passage of forceps through the tube, the thin single blade can be easily passed over the foreign body, it will hold almost any object whatever its size or consistency, and there is less risk of breaking up a fragile foreign body.

Bensaude and Lelong[4] have devised a modification of Brünings' telescopic bronchoscope. A defect in the latter instrument is that it is very difficult to introduce the inner tube and slide it down in the outer tube to the desired distance. This difficulty is due partly to the length of the inner tube, and partly to the tendency for it to move downwards in a series of jerks which make accurate and gentle manipulation difficult. In this new instrument the difficulty is removed by means of a rack-and-pinion movement.

The rapid progress in endoscopic methods is emphasized by the fact that **Topical Applications** to the regions of the œsophagus, trachea, and bronchi are being frequently advocated and practised. Jackson and Spencer[5] advise the insufflation of dry bismuth through the bronchoscope, with a subsequent radiogram, as a method of mapping out the bronchial tree in the localization of foreign bodies and determination of bronchiectatic and abscess cavities; also the direct application of **Silver Nitrate** to œsophageal erosions and of **Diphtheria Antitoxin** to the walls of trachea and bronchi in cases of diphtheria. Bronchiectatic and lung abscess cavities can be frequently washed out and in some cases cured.

References.—[1]*Amer. Jour. Med. Sci.* 1921, May, 625; [2]*Jour. Amer. Med. Assoc.* 1921, Feb., 577; [3]*Laryngoscope*, 1920, Nov., 723; [4]*Presse méd.* 1921, May, 413; [5]*Therap. Gazette*, 1921, April, 234.

EPIDERMOPHYTON INGUINALE.

E. Graham Little, M.D., F.R.C.P.

Wende and Collins[1] point out that this fungus may in fact invade any part of the body, and is somewhat misnamed, in that the inguinal region is not that most frequently affected. Their paper concerns 37 cases of 'dermal scaling', and the authors consider the essential clinical feature of the disease to be areas of scaliness varying in size from that of a split pea to 4 to 5 inches square, with sharp outlines, thickening of the epidermis, without inflammation of adjoining tissue, and with frequent occurrence of vesicles, attended by itching and hyperidrosis.

Technique Used by Authors.—Sabouraud's technique was used throughout the laboratory study of the 37 specimens examined. The investigation consisted of four steps: (1) The customary microscopic examination of the scales and hairs for spores, mycelial threads, and fungal organs; (2) The direct making of two separate plants in Sabouraud's medium of the scales found to contain spores—these plants were designated 'primary and secondary'—and the re-seeding of each through ten to twelve generations which were designated 'subsequent' cultures; (3) The microscopic examination of the mycelia and organs produced from each culture; and (4) The inoculation of guinea-pigs with the culture growth diagnosed as *Epidermophyton inguinale*. When an inoculation was made the hair of the guinea-pig was cut short, and the closely trimmed surface cleansed with alcohol and scarified, after which the macerated culture growth was rubbed in freely. As a control, the hair was clipped at another location remote from the inoculation, and the cut surface cleansed and scarified but not inoculated.

The microscopic examination of the original scrapings from the 37 cases showed the presence of spores in 26, of mycelia in 3, and of fungal organs (asci) in 5; spores were absent in 13 cases.

Reference.—[1]*Arch. of Dermatol. and Syph.* 1921, Jan., 1.

EPIDIDYMIS. (*See* Testicle and Epididymis.)

EPILEPSY. (*See also* Non-specific Protein Therapy.)

J. Ramsay Hunt, M.D.

The cause of epileptic seizures in tumours of the temporosphenoidal lobe has been studied by MacRobert and Feinier.[1] With varying degree of emphasis all text-books mention the importance of generalized epileptic seizures as a symptom of brain tumour. One author places them second only to headache in importance; another states that they occur in as many as 50 per cent of the cases. In a series of 165 cases of brain tumour coming to operation at the Neurological Institute in the last few years, they found that generalized epileptic seizures occurred in only 4 of the cases.

OCCURRENCE OF CONVULSIONS IN 165 BRAIN TUMOURS.

Character	Location of Tumours	No. of Cases	Total Cases
Major epileptic seizures	Temporosphenoidal	3	
	Postparietal area	1	4
Localized Jacksonian spasms	Frontal, involving motor area	6	
	Parietal, near motor area	5	11
Generalized convulsions without unconsciousness	Temporosphenoidal	2	
	Intraventricular with extreme hydrocephalus	1	3
Localized Jacksonian spasms occasionally accompanied by unconsciousness	Frontal, involving motor area	4	4

It is perhaps not difficult to understand why such high estimates of the frequency of epileptic seizures in brain tumour have been made. Some of them are due to impressions obtained by writers years ago, at a time when Jacksonian spasms were the best-known localizing sign of a brain tumour and a usual indication for operation. As it was customary at this time to refer to such spasms as epileptic seizures, it follows that the latter should figure numerously in statistics.

Another possibly confusing element in this connection is the loss of consciousness which occasionally accompanies localized Jacksonian spasms. Localized Jacksonian spasms indicate the exact area of the brain cortex which is most unstable. If a tumour is the cause of the instability, it will almost always be in the immediate vicinity of this area. The loss of consciousness which occasionally occurs with such an attack, as in 4 of the 11 cases in the above series, by no means puts the attack in the category of generalized epileptic seizures or destroys its distinct localizing value. Indeed, loss of consciousness does not seem to have an especial significance in such cases, and may precede, accompany, or follow the attack. One patient would regain consciousness while the limb was still jerking; another would lose consciousness only at the conclusion of a severe attack.

Nevertheless, typical generalized epileptic seizures have often been definitely described as occurring in cases of brain tumour. In the above series they were a frequent accompaniment of tumours of the temporosphenoidal lobe. There were 5 such tumours; 3 caused typical epileptic seizures, and the other 2 caused attacks somewhat similar. The frequent occurrence of epileptic seizures in temporosphenoidal tumours in other cases has also been noted. In contributions to the subject by Ferrier and by Mills, 27 cases are recorded. In 13 of these, almost 50 per cent, generalized epileptic seizures occurred. In a report of 9 cases of temporosphenoidal-lobe tumour by Foster Kennedy, 4 patients had typical major epileptic seizures, and 3 others, he says, "suffered at some time or other from sudden attacks of loss of consciousness associated with cyanosis and stertorous respiration".

The authors call attention to the fact that the Sylvian artery passes over the superior surface of the temporosphenoidal lobe, with the frontal lobe above it. Therefore any abrupt transient compression of the Sylvian artery because of an increase in the congestion or œdema surrounding the tumour, by suddenly reducing the cortical blood-supply, could be responsible for the epileptic seizures that occur in the course of such a large percentage of temporosphenoidal tumours. In addition, pressure from within and above downward on the Sylvian artery, as may occur with a large internal hydrocephalus, could also, in the same manner as a temporosphenoidal tumour, produce a wide area of cortical instability leading to epileptic convulsions. In this connection it is interesting to note that dilated ventricles, the post-mortem evidence of internal hydrocephalus, are observed to occur in almost one in three of the necropsies on epileptics at Craig Colony.

A study of the measurements of intracranial pressure changes in an epileptic and its experimental variations was planned by Ebaugh and Stevenson[2] after a series of observations of the changes in intracranial pressure in the case had been made. As a result of their studies, the following conclusions were reached :—

Intracranial pressure changes may be measured by the application of an inverted tambour to an area of bone defect. With this recording tambour it is possible to observe changes in intracranial pressure, which roughly follow absolute pressure changes in the cerebrospinal fluid. Rhythmic changes in intracranial pressure of varying types have been recorded. Epileptic attacks are associated with a rise in intracranial pressure and are unaccounted for by activities of the patient. A rise of blood-pressure sometimes occurs with the rise of intracranial pressure during the attacks. The patient gives subjective complaints associated with these changes. Petit mal attacks show typical kymographic tracings of pressure changes.

Intracranial pressure is lowered by the intravenous and oral administration of **Hypertonic Solutions.** The oral administration of 200 c.c. hypertonic Ringer's gives a transient fall of 20 mm. (H_2O), with a terminal rise of pressure. The result of a 30 per cent **Hypertonic Glucose** given intravenously is a prolonged fall of pressure averaging 20 mm., after a slight initial rise. These changes observed by the recording system represent far greater changes in the true intracranial pressure. Glucose is better for therapeutic purposes.

The administration of hypotonic solutions (water) gives a constant increase of intracranial pressure. These changes are adequately controlled by the use of isotonic solutions.

Röntgenography of the head in epilepsy has shown *hypertrophy of the cerebellum to be a cause.* Anton[3] enumerates a long list of pathological conditions which may entail genuine epilepsy, from fœtal or infantile encephalitis to the lack of proportion between the brain and the skull, interference with the normal escape of cerebral fluid and normal circulation in the venous system, hydrocephalus, and hypertrophy of the cerebellum. Röntgenography of the head has shown surprisingly often that the cerebellum is abnormally large in epileptics. The röntgenograms in the case of a boy of 8 are reproduced ; the hypertrophy of the brain and cerebellum had induced the clinical picture of a brain tumour. Puncture of the corpus callosum gave transient relief, and still greater relief followed opening the occipito-atloid ligament. Fluid escaped, and the brain began to pulsate at once. Anton describes the Röntgen-ray findings in 15 epileptics, showing that relative hypertrophy of the cerebellum is by no means rare, and that any abnormal size of the cerebellum can be readily recognized with the Röntgen rays. The clinical picture from hypertrophy of the cerebellum has not been studied as yet, although that from defective development is comparatively well known. The results in injury of the tentorium during birth should also be studied with the Röntgen rays with a view to epilepsy. Decompression operations have a field in true epilepsy. Anton suggests that with severe epileptic seizures for which the over-large cerebellum seems to be responsible, we might consider incising the dura mater of the tentorium and thus relieving from pressure the parts of the brain in the posterior cranial fossa.

TREATMENT.—A. Brüning[4] has employed **Extirpation of the Adrenal** in the treatment of epilepsy, a method based on theoretical considerations which had been advanced by H. Fischer, of Giessen. He therefore determined to put Fischer's theory to the test, and performed the operation on 9 patients. For surgical reasons the left gland was chosen as the more suitable for extirpation. In all of the cases the author claims a marked benefit, and in some complete relief from the seizures. Bumke and Küttner[5] also discuss this method of treatment from the surgical standpoint, and have developed a technique for the operation based upon Fischer's suggestive experiments.

Peiper,[6] of Schmieden's clinic, has also used this method on 7 patients, with apparently good results. The benefit was only temporary, for sooner or later the attacks recurred with all their old-time severity. Peiper asks if the temporary improvement was not due merely to the surgical procedure and loss of blood.

Cordua warns against a too optimistic interpretation of the results in Brüning's cases, and emphasizes the important fact that the longest period of observation after the operation and before his report was only five months.

McCartney[7] reports on the use of **Sodium Biborate** in the treatment of epilepsy in an institution where there were 60 epileptics, the majority chronic cases, and a large number of them resident for many years. Formerly the routine treatment was a large dose of potassium bromide (30 gr.) night and morning. This has had little effect in reducing the number of fits or bringing about any mental improvement. The only change noticeable was a lessening of excitability and an increase of mental confusion. Sodium biborate is mentioned in medical text-books as an alternative to potassium bromide. McCartney decided to try a mixture containing **Potassium Bromide** and **Sodium Biborate.** The benefit of the treatment was very marked in all the wards; in two, where the treatment had been in use for four months, the fits had been reduced by 64 per cent; and in two other wards in which the treatment had been employed for about six weeks, there was a reduction of 68 per cent, and that amongst patients who formerly had fits at regular intervals. Previous to treatment, three of them never went longer than eight days without having fits, and the others averaged twelve days and then had a bout of from three to five fits. The total number of patients in whom the above treatment had been tried was 42; in all there was a marked improvement in the mental state of the patients, and in all except one the number of fits had been reduced. In addition to the marked mental change and lessening of the fits, other points noticeable were the great reduction in the amount of sedative used, and the marked diminution in the number of accidents which occurred.

REFERENCES.—[1]*Jour. Amer. Med. Assoc.* 1921, Feb. 19, 500; [2]*Johns Hop. Hosp. Bull.* 1920, Dec.; [3]*Jour. Amer. Med. Assoc.* 1920, Dec. 4, 1603; [4]*Centralb. f. Chir.* 1920, Oct. 23, 1314; [5]*Ibid.* Nov. 20, 1410; [6]*Ibid.* 1921, March 26, 407; [7]*Brit. Med. Jour.* 1920, ii, 548.

EPISPADIAS AND ECTOPIA VESICÆ. *Sir John Thomson Walker, F.R.C.S.*

Thompson[1] discusses a new operation in which he constructed a compressor urethræ from the lower part of the rectus abdominis. The following anatomical facts were ascertained before attempting the operation. The twelfth dorsal nerve supplies the lower two-thirds of that portion of the rectus which lies below the umbilicus. Two terminal branches are formed; the one passes upwards and the other downwards. The iliohypogastric nerve does not supply the lower end of the rectus. The lower portion of the rectus could therefore be dissected away from its sheath without the surgeon seeing or damaging the nerve-supply. The blood-supply is drawn from the deep epigastric, which runs beneath the muscle, adherent to it rather than to the sheath.

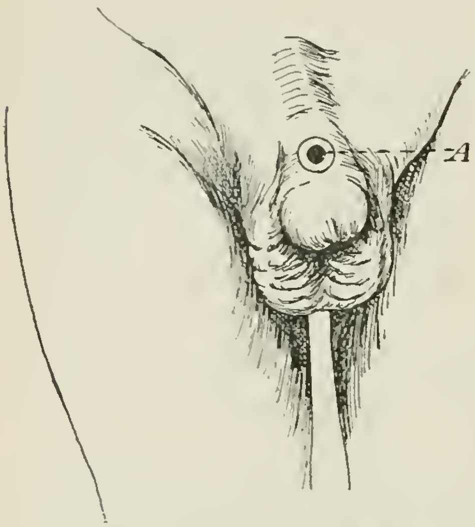
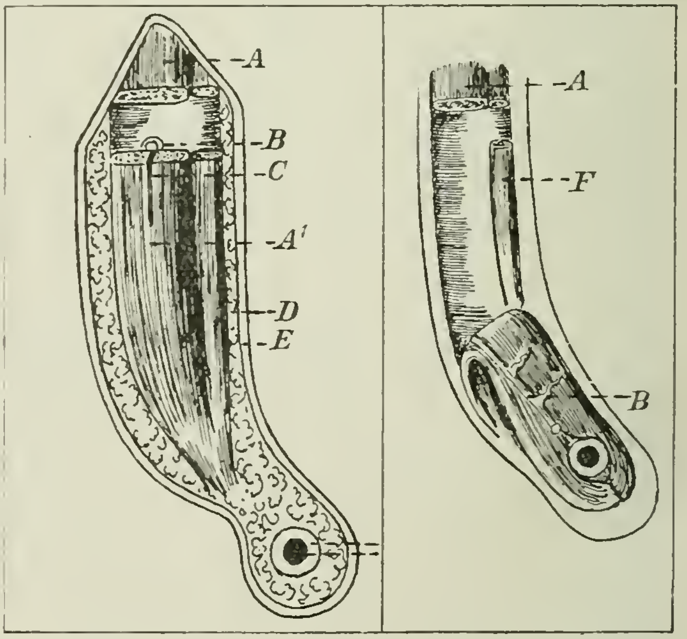


Fig. 20.—*A*, Orifice of epispadias.

A circular incision was made round the orifice of epispadias (*Fig.* 20) and carried deeply into the cavernous tissue of the penis for about 1½ in. An incision was made from the level of the umbilicus downwards and curved inwards to join the circular incision. The anterior wall of the rectus sheath was incised vertically and the rectus muscles divided transversely 1 in. below the umbilicus (*Figs.* 21, 22). The under portion of the muscle, which was double, was left in position, the other portion was turned downwards, the interior attachment being untouched. The end of the muscle was split longitudinally and the two ends were placed on each side of the orifice of the epispadias and sutured to the tissues round the orifice and to each other. Lembert sutures buried this part of the muscle. At the end of three weeks the patient was holding his water whilst in bed for one and a half hours, and when he micturated he directed the stream forward with considerable force. Later he could retain the urine in the erect position and micturate at will. [This case was demonstrated at a clinical meeting of the Urological Section of the Royal Society of Medicine at Guy's Hospital.—J. T. W.]



Figs. 21, 22.—*A*, Upper end of divided rectus. *A*¹, Lower portion of divided rectus. *B*, Deep epigastric artery. *C*, Rectus longitudinally split. *D*, Superficial fascia. *E*, Skin. *F*, Inner portion of rectus.

Roberts[2] describes a method of operation for ectopia vesicæ which he has employed in 4 cases. Two years is the age he chooses for operating. A small French catheter is passed 3 in. into each ureter and fixed by passing a fine catgut suture through the bladder mucous membrane and through the catheter. The bladder mucous membrane is incised circularly about 1 in. from the orifice of the ureter and the incision carried through the bladder wall until the ureter is reached, taking care not to injure the vessels. Two inches of the ureter are drawn into the wound. The assistant inserts the right forefinger into the rectum and presses its anterior wall into contact with the posterior wall of the bladder at a level well above the ureters. The bladder wall lying between the ureteral pouches is incised transversely on to the assistant's finger until the peritoneal cavity is opened. When the anterior rectal wall protrudes through the incision, the edges of the bladder incision are extended to the rectal wall so that an area of the anterior surface of the rectum 2 in. by 1 in. is completely shut off. Through this area an incision about 1½ in. long is made into the bowel, and the catheters are passed through the opening and drawn from the anus into the ureters with their surrounding mucous membrane lying just within the rectum. The opening into the rectum is closed so that the ureters are fixed in the angles of the wound. The transverse incision in the bladder is sutured over this. The bladder wall is dealt with at a second operation.

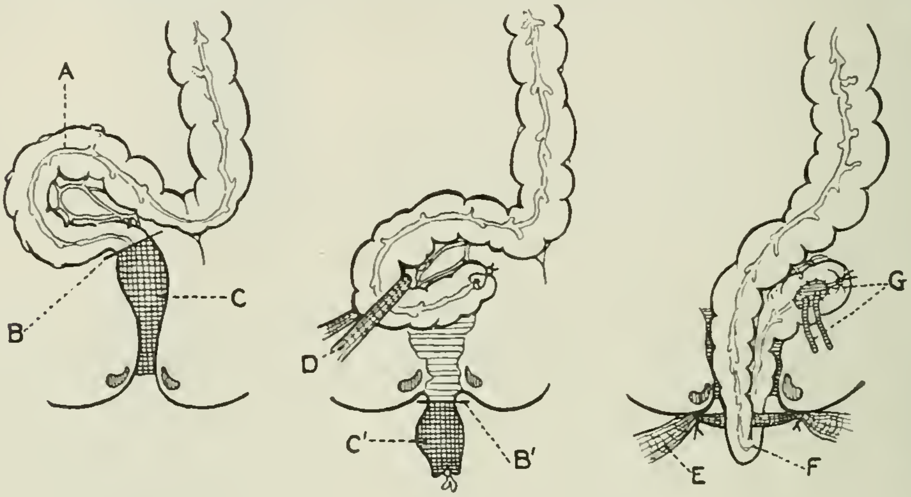
Lower[3] records a case of exstrophy of the urinary bladder with carcinoma. The patient, a man age 50, wore a metal urine collector of his own device. The right ureter was first transplanted into the rectum, and eighteen days later the bladder was excised and the right ureter transplanted into the rectum. Two months later the patient was in good condition, with complete urinary control.

Coffey[4] publishes an article on the implantation of the ureter into the large intestine. He describes the work leading up to the conclusions that: (1) A ureter implanted directly into a dog's intestine always dilates, and sooner or later the kidney is distended by pressure and infection ; (2) A ureter which has been transplanted and made to run immediately under the mucosa of the intestine of a dog does not dilate as a rule. The original technique which he used for the common bile-duct and later on the ureters is as follows : The duct is isolated, ligated, and cut across above the ligature. One wall of the duct is split with scissors. A linen suture is passed through the split end of the duct so as to include about one half of it, and is tied. The linen thread is thrown around the other half and tied. The loose ends are threaded on two needles. By this method the full strength of the duct is maintained for traction, and the opening is maintained by the slit. The intestine is picked up and an incision an inch or more in length made through the peritoneal and muscular coats, including submucous tissue. The muscular layer is loosened from the mucosa with the point of the knife until the mucosa points out through the incision. A stab wound is made through the mucosa and the two needles are passed through this into the lumen of the intestine and out through the intestinal wall ¾ in. further along the intestine and ¼ in. apart. Traction on the threads draws the ducts through the stab wound into the intestinal lumen. The two ends of the threads in the ducts are tied outside the intestine. Five or six sutures are passed through the peritoneal and muscular coats on each side of the incision and tied. The duct lies just beneath the mucous membrane, which has been loosened for approximately ¾ in. of its course. The ureter is tacked to the peritoneum and its point of entrance by two or three fine linen sutures. For additional security another line of continuous chromic catgut sutures may be made to cover the first line.

Mayo uses catgut instead of linen, curved rubber clamps for holding the intestine, and continuous catgut instead of interrupted sutures. He draws attention to the necessity for implanting the right ureter first, low down in the rectum, and at the same time fastening the parietal peritoneum to the intestine near the anastomosis. Ten days later he transplants the left ureter into the sigmoid. A rubber tube is passed into the rectum. He states that the most favourable age for operation is from four to ten years.

Mayo states that in 52 patients suffering from ectopia vesicæ, 6 were operated on by the plastic method, and 1 died six months later; 3 were operated on by the Meydl-Moynihan method, and 2 died of uræmia; 26 were operated on by the transplantation method, 22 successfully, and 4 died shortly after the operation; 17 were not operated on for various reasons.

Kleinschmidt[5] describes the following operation for ectopia vesicæ. The ureters with a small area of bladder base are detached from the bladder, and about 10 cm. of the lower ureters prepared. The abdomen is opened between the umbilicus and the pubic symphysis. The bowel is cut across between the lower part of the sigmoid and the rectum, and both ends are closed. The rectal wall is prepared by blunt dissection of the submucous layer as far as the sphincter, and drawn out of the anus. This is cut away, leaving only a small ring of mucous membrane. A strip of iodoform gauze is passed through the mesosigmoid and the flexure, doubled on itself, drawn through the anus by means of the gauze. The bladder base with ureteric openings is implanted into the blind lower muscle of the sigmoid. The doubled sigmoid flexure is then stitched to the anus and the iodoform gauze strip stitched to the skin on each side. After twelve hours an opening is made into the knuckle of sigmoid which protrudes through the anal sphincter. (*Figs.* 23–25.)



Figs. 23, 24, 25.—Kleinschmidt's operation for ectopia vesicæ. A, Sigmoid flexure; B, Upper line of division of rectum; B , Lower line of division of rectum; C, rectum; C', Rectum turned inside out and brought through anus: D, Strip of iodoform gauze; E, Gauze stitched to skin; F, Knuckle of sigmoid drawn through anus; G, Remains of bladder with ureters. (*Redrawn from the 'Centralblatt für Chirurgie.'*)

References.—[1]*Lancet*, 1920, ii, 790; [2]*Ibid.* 1921, i, 1125; [3]*Ann. of Surg.* 1921, March, 354; [4]*Surg. Gynecol. and Obst.* 1921, May, 383; [5]*Centralb. f. Chir.* 1920, Nov. 13, 1386.

EPITHELIOMA OF THE SKIN. (*See* Skin, Epithelioma of the.)

ERYSIPELAS.

E. Graham Little, M.D., F.R.C.P.

Adams[1] mentions the failure of stock vaccines to influence this condition, a failure which is explained by the multiplicity of the strands of streptococci causing the disease. After trial of numerous topical applications, he now regards **Brilliant Green** as much the most successful, both in mitigating the intolerable itching, and in checking the spread of the inflammation. This application is non-toxic. The method used is to paint the affected area with a 5 per cent aqueous solution once a day in mild cases and twice a day in severe ones. No dressing is applied except a piece of lint on some parts of the body to prevent staining of the bedclothes. When the eruption has subsided, the discoloration can be removed in three or four days by vigorous washing, preferably with ether soap. Possibly it would be wise to apply the solution over rather a wider area than that actually involved—for, say, an inch outside the advancing edge.

Reference.—[1]*Brit. Med. Jour.* 1920, ii, 779.

ERYTHEMA, RECURRENT SCARLATINIFORM.

E. Graham Little, M.D., F.R.C.P.

Grindon[1] describes a very extraordinary case of a scarlatiniform erythema in a male student, age 17, in robust health at the time of onset. The first attack closely simulated scarlet fever, and was in fact diagnosed as such. The eruption lasted three days, exfoliation followed, and apparently complete recovery took place. About ten weeks later a second and more severe attack with high temperature occurred, from which he again recovered with profuse desquamation. Nine days later a third attack came on, and he was then seen by the writer. The face, including the lips, neck, trunk; the upper extremities, including the hands; the hips and thighs, showed a bright scarlatiniform redness. On the upper part of the legs, below the knees, the eruption was rather fine punctiform, in places coalescing into a continuous erythema. The feet were free from the eruption. The palms were deep red, due to exposure of the thinned epithelium by the last desquamation, which still persisted at the borders of the hands and at scattered points elsewhere. The mucous surfaces of the soft and hard palate, pharynx, fauces, tonsils, and the buccal mucosæ were deep red, velvety and swollen. The tonsillar crypts were not distended. The tongue was in part covered with a thick white coat, through which showed the red fungiform papillæ, as in scarlet fever, or, where this had become detached, it was smooth and bright red. There was throat pain only on attempting speech or deglutition, and even then the effort was more difficult than painful. The lateral cervical lymph nodes were much enlarged. No other adenopathy was present. There was slight pain and tenderness about the elbows and other large joints. The bowels were slightly costive. Heart and lungs were negative. Mentality was clear. The throat sloughed, and the patient died a few days later. No post-mortem could be obtained.

Reference.—[1]*Arch. of Dermatol. and Syph.* 1920, Nov., 623.

ERYTHRŒDEMA.

Frederick Langmead, M.D., F.R.C.P.

By this term Swift, of Adelaide, has described a condition of redness and swelling of the hands and feet occurring in children. A. Jeffreys Wood[1] writes from notes of 91 cases collected since Swift's paper became available in 1917. The disorder affects children on the breast as early as 3½ months old, as well as those fed by the bottle, or older children running about well, up to 3 years and 6 months. Most of the patients were between 8 and 18 months old.

Symptomatology.—The symptoms are thus depicted. The child is carried in with the head bent down into its mother's chest, or frowning with half-closed eyes, as though it dreaded the light, and refusing to look up; usually it is whining and fretful. Some patients do not seem able to rest, scratching at their feet or pulling at their hair or ears, frequently making them bleed. If placed on the floor they bend their heads forward almost down to their feet. They do not smile, and resist any attempt to amuse them. In some cases the red swollen appearance of the hands is an early symptom. They are worn out from want of sleep, and in distress from the intolerable itchings of the skin of the body, hands, and feet. They sometimes become vicious, scratching and biting at their mothers' faces.

The earliest symptoms in young infants seem to be continual fretfulness and inability to sleep, with disinclination for food. After a week or two the skin may begin to act freely, and a profuse, extremely irritating sweat rash appears over the front and back of the trunk. Later, after 2 or 3 weeks or perhaps 4 or 5 months, the redness of the hands and feet is noticed. Wasting occurs early, the muscles becoming soft and weak. The neck muscles cannot support the head, and in older children the power of sitting up or walking is lost. Stomatitis is frequent, some children having recurrent attacks; in severe cases the teeth may fall out. Photophobia is also common, and may recur several times during an attack. The scratching may lead to abrasions and ulceration from secondary infection.

Redness of the hands and feet, accompanied by an icy coldness, is the most characteristic symptom. The redness is usually limited to the part below the wrist line, and is persistent. Loss of finger- and toe-nails is not rare; one patient shed his toe-nails five or six times in the course of his 13 months' illness. There is also sweating, and the formation of small vesicles about the fingers and toes. This free action of the skin with profuse sweating explains the miliarial rash, which seems to be the chief cause of the discomfort, and has given rise to the name of 'pink disease'. When the rash is considerable the glands in the axillæ and groins become enlarged. The rectal temperature is usually between 99° and 100°. Insomnia is the worst symptom and the most difficult to relieve. Constipation was more usual than diarrhœa in the cases. The urine is scanty. Improvement begins by return of sleep and a regular gain in weight, and relapse is very rare.

Treatment.—The author advises that the child should be in the open air throughout the twenty-four hours, and should rest quietly and not be disturbed by attempts to amuse it. A change from town into bracing country air often leads to rapid improvement. For the sweating and irritability of the skin great relief is provided by rubbing the whole trunk and limbs, at least twice daily, with **Methylated Spirit** and by free dusting with **Zinc** and **Starch Powder.** A loose silk garment is recommended for underwear. For the irritable fingers and toes, painting with **Tincture of Iodine** proved very satisfactory. **Pancreatic Emulsion** and also **Byno-plasma** seemed of value. The insomnia was most refractory even to large doses of soporifics.

Prognosis.—Most of the patients recover completely, but the duration is variable. Two cases continued for as long as twelve and thirteen months respectively. The symptoms will almost certainly last for three or four months. Five deaths occurred in the 91 cases. In only 1 was it directly attributable to the disease; the other 4 died from bronchopneumonia. Autopsies revealed no special change.

Reference.—[1] *Med. Jour. of Australia*, 1921, Feb. 19, 145.

EYE. (*See* Argyll Robertson Pupil; Optic Neuritis.)

EYE AFFECTIONS ASSOCIATED WITH DISEASE OF OTHER ORGANS.

Lt.-Col. A. E. J. Lister, I.M.S.

Arteriosclerosis.—Adams[1] in an interesting paper discusses fully the relations of arteriosclerosis and eye affections. He points out that at the age of presbyopia symptoms due to blood-pressure may be such as would lead to the suspicion of eye-strain. It is important from the point of view of early treatment that this should be recognized. Headache on waking in the morning, he says, is never caused by the eyes, but should raise a suspicion of high blood-pressure. Among the signs of increased blood-pressure, those that have impressed him most are the narrowing and light colour of the retinal arteries and the interruption of the light reflex from the vein as it approaches an artery crossing it. Irregular calibre of the artery is one of the commonest and more important signs of arteriosclerosis with renal and cardiac changes. Loss of translucency of the arterial wall is characteristic of severe sclerosis. The prognosis of such cases is more serious in young subjects and those who have marked renal involvement. The older the patient, the better the prognosis as regards life.

Arthritis Deformans.—Friedenwald[2] describes four cases of eye disease complicating arthritis deformans: one of scleritis, marginal ulcers in the other three, associated in one case with a chronic and stubborn conjunctivitis. He suggests that these may be due to the causal organism of arthritis deformans, which is possibly a streptococcus.

Dental Disease in relation to Ocular Affections.—Bell[3] reports a series of cases of ocular lesions due to dental infections. One patient had a severe bilateral plastic iritis, which cleared up very rapidly after the extraction of fourteen badly-diseased teeth. In another case of choroiditis with vitreous opacities, vision was brought up from 20/200 to 20/20 by attention to badly-infected teeth. A patient with retinal hæmorrhages and a dental infection with *Streptococcus hæmolyticus* recovered fully after treatment by **Vaccines** made from the extracted teeth.

De Schweinitz[4] emphasizes the importance of careful search for dental foci of infection in ocular disease. The dental area need not be extensive to cause grave ocular lesions. Root abscesses and pulpless teeth should be looked for.

Wirtz lays stress on the occurrence of purulent choroiditis, iridocyclitis of the acute and subacute type, iritis, etc., due to dental disease. Parenchymatous keratitis, bilateral chronic iritis, unilateral chronic marginal blepharitis with marginal keratitis, may have their remote origin in dental disease. He insists on the necessity of the use of **Radiography** in addition to the other methods of examination, and says that without it we cannot exclude dental affections.

W. L. Benedict,[5] whilst believing in the value of clearing up mouth infections before undertaking operative procedures, states that the increased surgical risk from abscess of the teeth and pyorrhœa has been exaggerated. It is not only unnecessary but inadvisable to subject an elderly person to dental treatment sufficient to make the eye clean, as it imposes an unnecessary strain on the strength and courage of a person, who has often none too much to spare. He reports a most interesting case, in which iritis had occurred every spring and autumn for six years in a patient in whom, for about three days previous to each attack, a certain tooth became tender, often accompanied by rheumatic pains. It was a live tooth, and *x* rays showed no apical abscess. After extraction, a culture was made from the pulp, which when injected into the blood-stream of a rabbit, caused hæmorrhagic iritis in a few hours. Benedict states that whilst an **X-ray Examination** and tests of vitality are absolutely necessary, there is need to take into account the history of the patient's dental disturbances.

In a prolonged discussion on Benedict's paper,[6] several speakers insisted on the necessity of the mouth being rendered surgically clean before operation. In his reply, Benedict pointed out that the patient has set up a natural barrier against infection, which he has found adequate for a number of years. If, however, post-operative inflammation is set up, the existence of a focus of infection may lead to the inflammation being kept up for an indefinite time, owing to the production of toxins. [Our experience also is that an

x-ray examination is of the greatest possible service, and we regard no examination of the teeth as complete or satisfactory without it. We would insist on the necessity of every tooth being examined.—A. E. J. L.]

Encephalitis Lethargica.—M. L. Lhermitte[7] says that the affections of the intrinsic muscles of the eye are of two types : they may be of nuclear or extra-nuclear origin. In the latter case there are pareses or complex paralyses. The variable nature of the affections of the motor functions is due to the fact that sometimes the disease affects the nerve-cells, and at others the fibres connecting up the nuclei of the motor nerves of the eye. Numerous cases of amblyopia and blindness have been reported, showing that the optic nerve is sometimes affected. Motor affections of the iris and ciliary muscle are extremely common. They are characterized by being dissociated and of temporary duration. Though Argyll Robertson's sign may be seen, its temporary duration will denote its non-syphilitic origin. Treatment is in the tentative stage and is that of the primary disease.

Influenza.—E. Jackson[8] describes and gives two coloured illustrations of thrombosis of retinal veins after influenza. One of these drawings has been kindly lent us by the author and is reproduced here. (*Plate X.*) Both were in women, age 59 and 33 respectively. Both recovered almost their full vision, and were alive and in excellent health one and a half and two years after. Jackson reviews the literature of the subject in a very interesting article, which brings out also the importance generally of influenza as a cause of ocular affections. The prognosis of post-influenzal thrombosis is generally favourable, vision being usually more or less completely recovered.

J. Maitra[9] found all structures of the eye except the lens to be affected in influenza. The conjunctiva and lachrymal sac were most frequently affected. He saw one case of dendritic keratitis, which he says is rarely seen in influenza. Paresis of accommodation was common. Extensive and multiple patches of hæmorrhage in the retina, without rise of blood-pressure, is a special feature of the retinitis of influenza. The prognosis generally is favourable. Wood[10] reports many cases of paresis of accommodation following influenza. Many were associated with loss of hair. Recovery was slow. Cramer[11] describes an unusual case of thrombosis of the central artery of the retina and papillitis following influenza. [From the apparent frequency of ocular affections after influenza it appears to us that practitioners treating such cases would do well to bear their possibility in mind, as early recognition is very desirable.—A. E. J. L.]

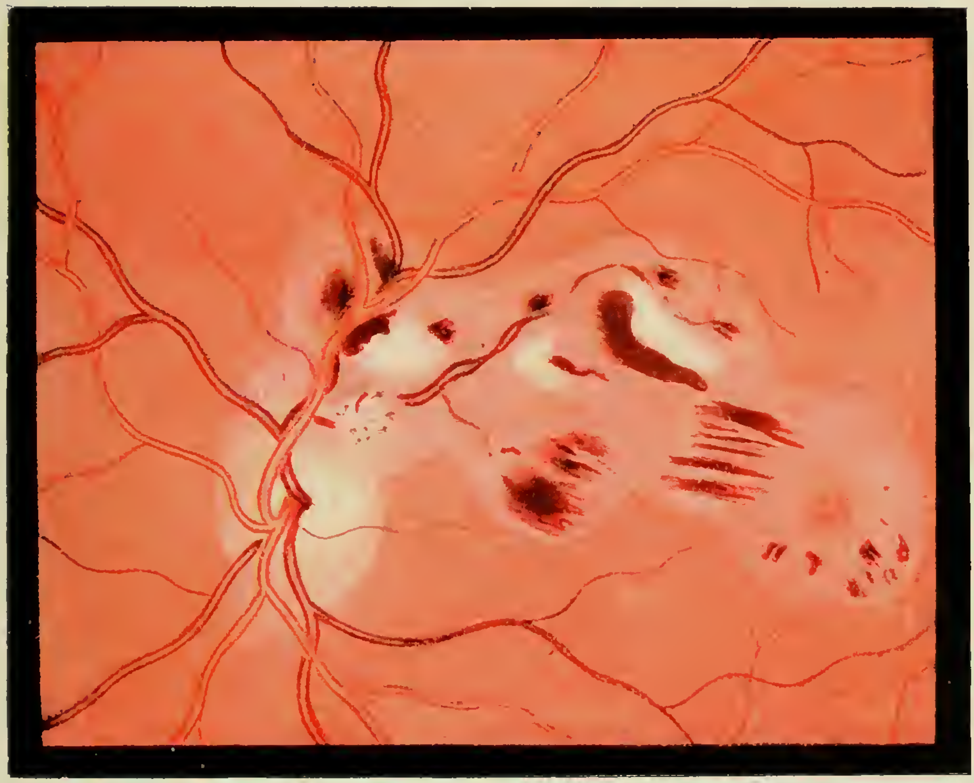
Graves' Disease.—Foster Moore[12] leans to the conclusion that exophthalmos and limitation of movement of the eye in Graves' disease are due to excess of orbital fat. In a case where it was necessary to do something to save the cornea, he removed a heaped-up teaspoonful of fat through the inferior fornix, allowing of the closing of the lids. The cornea was saved.

Meningitis and Ocular Traumatism.—De la Personne[13] describes a case of a boy whose eye was penetrated by a piece of glass. He was admitted with panophthalmitis. There was headache and excitement. Exenteration with complete curettage and thermocauterization of the orbit was done. The boy died twelve days later with meningitis. The author insists on exenteration and the use of the thermocautery in such cases as the only correct treatment. If fever, headache, or other complications are present, the possibility of meningeal complications must be taken into account when giving a prognosis.

Nasal Sinus Disease and Optic Neuritis.—E. C. Ellett[14] describes fully two cases of optic neuritis associated with disease of the nasal sinuses, and gives reproductions of the fields of vision and the skiagrams of the cases. He calls attention to the sudden onset of the visual disturbances, and its equally sudden

PLATE X.

THROMBOSIS OF A RETINAL VEIN FOLLOWING INFLUENZA



Condition of the fundus seven weeks after onset, showing œdema of the retina and hæmorrhages in the region of distribution of the affected vein.

Reproduced from a drawing made and kindly
lent by Dr. Edward Jackson, Denver, U.S.A.

improvement when the nasal condition is relieved. In one case reported it rose from perception of light to normal in four days. He calls attention to the difficulty of diagnosis of disease of the posterior nasal sinuses, and advises the oculist to insist on repeated examinations if necessary.

Neurological Aspect of Ophthalmic Cases.—J. Taylor[15] has grave doubts if paralysis of the sixth nerve is ever due to cold. It is often the initial sign of some general condition, for example, disseminated sclerosis, tabes, or encephalitis lethargica. Facial paralysis is admittedly often caused by cold, yet he has never seen sixth-nerve paralysis in connection with it. Third-nerve paralysis is fairly common, and nine cases out of ten are due to syphilis. Pituitary troubles may affect the third nerve. He calls attention to the fact that the grave symptoms of myasthenia gravis—double ptosis and almost complete ocular paralysis—may temporarily clear up completely and lead to a wrong diagnosis of hysteria.

He gives a special caution against too readily diagnosing hysteria in cases of ocular paralysis. He has seen myasthenia gravis and disseminated sclerosis mistaken for it. His experience has led him to anticipate the later development of signs of general paralysis, when he sees a case of optic atrophy, with loss of knee-jerks and lightning pains, without ataxy. Optic atrophy, however, seldom occurs in ataxic cases.

The pallor of the discs in disseminated sclerosis is an antecedent of retrobulbar neuritis. Vision of $\frac{6}{5}$ may exist with extreme pallor of the disc. Optic neuritis may be the only obvious sign of disseminated sclerosis: he cites a case in point. He calls attention to the importance of the physician's being on the look-out for alteration of the visual fields. In pituitary cases usually both temporal fields are affected. He calls attention to the improvement that takes place occasionally after treatment of such cases with thyroid or pituitary extract. In one case, thyroid was at first effective, while, after a relapse, pituitary extract cleared up the symptoms.

Pituitary Tumour.—W. L. Benedict[16] says that pallor of the discs and changes in the visual fields should always excite suspicion of pressure processes the etiology of which should be ascribed less hastily to tabes and other processes. Ocular symptoms often develop early in the disease. The decision for operation should properly rest on the changes in the visual field and the appearance of the optic discs, as operation is useless if the visual function is lost.

REFERENCES.—[1]*Brit. Jour. Ophthalmol.* iv, 298; [2]*Amer. Jour. Ophthalmol.* 1921, 431; [3]*Jour. Amer. Med. Assoc.* 1919, Oct., 1128; [4]*Dental Cosmos*, 1920, xlii, 565; [5]*Amer. Jour. Ophthalmol.* 1920, Dec., 863; [6]*Ibid.* 899; [7]*Presse méd.* 1920, Nov., 864: [8]*Amer. Jour. Ophthalmol.* 1920, Dec., 855; [9]*Ind. Med. Jour.* 1920, 171; [10]*Brit. Jour. Ophthalmol.* 1920, 415; [11]*Klin. Monats. f. Augenheilk.* 1921, 448; [12]*Lancet*, 1920, Oct.; [13]*Ibid.* 1921, April, 705; [14]*Jour. Amer. Med. Assoc.* 1920, Sept., 805; [15]*Lancet*, 1920, ii, 1121; [16]*Amer. Jour. Ophthalmol.* 1920, Aug., 571.

EYE AFFECTIONS, GENERAL. (*See also* CATARACT; CORNEA; GLAUCOMA; OPHTHALMOLOGY, PREVENTIVE; RETINA; TRACHOMA.)

Lt.-Col. A. E. J. Lister, I.M.S.

A. W. Ormond[1] answers the important question, "*Is electric light bad for the eyes?*" by saying that the consensus of opinion is that in electric light we have an illumination capable of doing greater injury to the eye than gas, and very much greater than an oil lamp. In incandescent lamps used for house illumination there is an irritating effect from long-continued exposure to the chemical rays: an oil lamp is less rich in actinic rays and gives a yellowish and softer light. [Our personal experience is that a good oil lamp gives much the least trying light for those whose eyes are at all inclined to tire easily.—A. E. J. L.]

W. H. Wilmer[2] mentions a case in which chorioretinitis followed an *antityphoid inoculation*, in a man who had a cold with evidently a sinus involvement. He advises not giving the inoculation where there is any sign of the existence of a focal infection.

Guglianetti[3] experimented on rabbits with diphtheritic, typhoid, and streptococcic toxins. He found that general intoxication produced by subcutaneous injections had very little effect ; the processes of repair were only slightly retarded. On the other hand, if diphtheritic toxin was dropped on the wound or injected subconjunctivally, fibrinous conjunctivitis of a necrotic type, keratitis, and iridocyclitis with hypopyon were produced. Necrosis of the damaged tissues and arrest of repair was caused in the wounds. Typhoid and streptococcic toxins, whether injected subconjunctivally or instilled into the eye, produced very little effect.

Choroid.—Fleischer,[4] writing on spontaneous detachment of the choroid, states that one form is associated with lowered intra-ocular tension and is due to shrinkage of the vitreous ; another is associated with rise of tension, due to transudation or exudation, originating in vascular changes or inflammatory exudation. Abadie[5] discusses the importance of chorioretinitis. Exogenous infections, though formidable, tend to get well. The endogenous variety, however, recurs more frequently and gets worse. It is usually syphilitic in origin. Optic atrophy may occur. He advocates intravenous injections of **Cyanide of Mercury**, ten to twelve injections, followed by a rest of three or more months. The treatment is then repeated.

Salzer[6] has treated a case of carcinoma of the choroid with **Röntgen Rays** for three years. Although clinically there was a probability of extension and metastasis, neither had occurred in this time. She had previously had a malignant growth removed from near the ear.

Conjunctivitis.—J. David[7] has found that the use of **Zinc Sulphate** 1 per cent, to which is added usually 5 per cent of a solution of **Adrenalin** 1–1000, is most effective in preventing attacks of catarrhal conjunctivitis, so common in Palestine. No case of trachoma developed during its use. He thinks it hinders the development of micro-organisms if introduced, and quotes the experiment of Raulin, who found that a culture inoculated with *Aspergillus niger*, placed in a silver vase, did not grow, though the amount of silver dissolved in the solution is not antiseptic, nor is it discoverable chemically. David's findings have been verified by Friedenwald,[8] of Baltimore, who worked for a time in Palestine.

Pascheff[9] describes a peculiar form of conjunctivitis, which he calls "la conjonctivite nécrosante infectieuse". General symptoms are present at the onset—general weakness, shivering, loss of appetite, sometimes headache, and almost always rise of temperature. It commences with the usual symptoms of conjunctivitis, but whitish specks and patches soon appear on the reddened conjunctiva. These are characteristic of the disease. There is simultaneous enlargement of the pre-auricular lymphatic glands, and of the submaxillary and parotid glands of the same side. The patches vary in size, being usually about as big as a millet seed. The course of the conjunctival condition is about two to three weeks. Three distinct stages are to be seen: (1) The stage of necrosis, during which the patches form on the conjunctiva ; suppuration is rare ; (2) The stage of ulceration, during which the superficial portions slough and fall off ; the whitish surface exfoliates as a little crust, leaving an ulcer ; (3) The stage of repair, during which the ulcers cicatrize and heal, leaving scarcely any scar.

The course of the metastatic inflammation of the glands lasts from one to three months. Occasionally they clear up without suppuration, but the majority suppurate. Suppuration may occur even one to two months after the disappearance of the conjunctival condition. The patient may present himself for treatment of the glandular condition after the disappearance of the conjunctival condition, and so lead to an error in diagnosis. The glands do not all suppurate at the same time, but at intervals, thus prolonging the affection.

It appears to be due to a microbacillus which Pascheff calls *Microbacillus polymorphus necroticans.* This bacillus is fatal when injected into rabbits and guinea-pigs. Whitish patches like those on the conjunctiva are produced on the spleen of rabbits and guinea-pigs. The blood of two patients gave positive reactions with this bacillus. The disease appears to affect only one eye, and the author contrasts it with Parinaud's conjunctivitis. No micro-organism was isolated in this disease, and Parinaud considered it was an infection of animal origin.

The treatment employed was **Compresses, Perchloride of Mercury Lotion** 1–4000, 5 per cent **Iodoform Ointment**, and, if the glands suppurated, **Operation.**

Ophthalmia Neonatorum.—Cantonnet[10] gives statistics showing that ophthalmia neonatorum is frequently not due to gonococci, and that in many cases no micro-organisms are found. In a series of 42 cases given, 18·5 per cent were due to gonococci, whereas 69 per cent were free from micro-organisms. He cites other statistics which give approximately similar findings. He finds these non-microbic cases show the special intracellular bodies, described originally by Prowacek and Halberstaeter in trachoma. Morax, Lindner, and others have investigated this condition and have succeeded in reproducing the condition in monkeys. The bodies may be stained by Giemsa's method or Tribondeau's. Their appearance is indicated in *Fig.* 26.

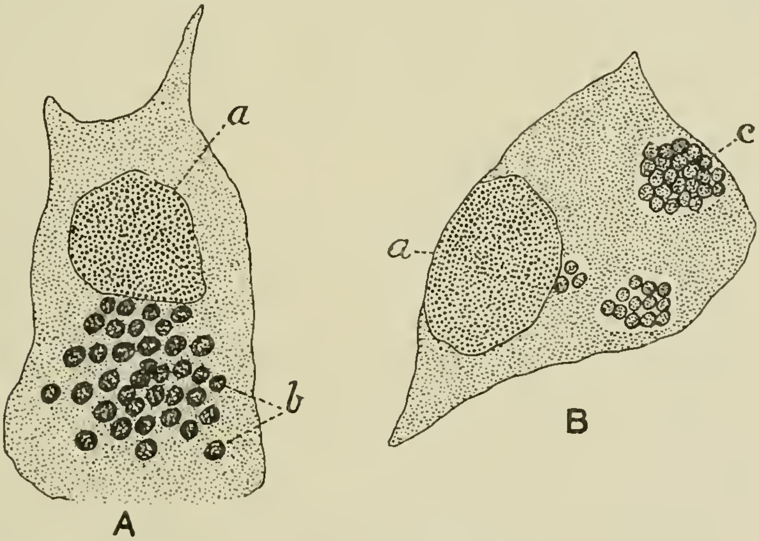


Fig. 26.—A, B, Epithelial cells of the conjunctival mucosa. *a*, Nuclei. *b*, Scattered inclusion-body, showing the cocci which compose it spreading in the protoplasm. *c*, Mulberry-shaped inclusion- body. (*Redrawn from ' La Presse médicale'.*)

He thinks it probable that these inclusion-bodies are the cause of the disease, as they have been found in the female vagina and the male urethra. Though these cases resemble gonorrhœal conjunctivitis, they may be suspected clinically from the fact that gonorrhœal cases start much earlier, from the first to the fourth day after birth, whereas the non-microbic form appears much later, about the thirteenth or fourteenth day. The cornea is rarely affected in these cases, and generally speaking the disease is less severe.

Cantonnet though advising the use of silver nitrate as a precautionary measure, in ophthalmia neonatorum, in case the infection be of gonorrhœal origin, points out that it has no action on the inclusion-bodies. If the inclusion-bodies are found and its non-microbic origin established by bacteriological examination, **Argyrol** 1–10 should be used, if the discharge is abundant. Rarely **Silver Nitrate** 1–200 to 1–150 is used. Towards the end of the suppurative stage, sulphate of zinc 1–100 suffices.

Dacryocystitis.—Villard[11] states that the passage of sounds as the sole means of treatment in dacryocystitis is of doubtful value and often harmful. It will in time be abandoned for more efficient methods of treatment. The best of the present methods is removal of the lachrymal sac.

Eye Strain.—H. A. des Voeux,[12] writing from the standpoint of the physician, says that though minor errors of refraction may not be of much importance as far as actual vision is concerned, the constant strain of adjustment throws a great strain on the nervous system. The commonest symptoms were fatigue and exhaustion. Patients became easily tired and unable to concentrate. Sometimes they had attacks of faintness, giddiness, and actual loss of consciousness, resembling petit mal. Patients were of the nervous, easily depressed type. A history of train sickness in childhood was often obtained. In children a dislike for games or cinema shows, and tendency to bilious attacks, were often due to refractive errors. He found it difficult to persuade people to get their eyes tested, as their sight was excellent and they disliked the idea of glasses. [The practical experience of every ophthalmologist of experience will, we think, support the writer in the views expressed above. We can recall many cases in point.—A. E. J. L.]

The important subject of *eye strain in cinemas* has been investigated by an influential committee presided over by Mr. J. H. Parsons, F.R.S.[13] They came to the conclusion "that the ocular discomfort arising is due mainly to the fact that the eyes of the spectators are directed upward at an abnormal angle, a condition which is conducive to eye fatigue and liable to give rise to headache and general discomfort; whereas the direction of the eyes horizontally or downwards appears natural and agreeable". They recommend: (1) That the angle of elevation, subtended at the eye of any person seated in the front row, by the length of the vertical line dropped from the centre of the top edge of the picture to the horizontal plane passing through the observer's eye, shall not exceed 35°, the height of the eye above floor level being assumed to be 3 ft. 6 in.; (2) That provided the first recommendation is complied with, the angle between the vertical plane containing the upper edge of the picture and the vertical plane containing the observer's eye and the remote end of the upper edge of the picture should not be less than 25°.

[Medical men are frequently consulted by patients who like the cinema, but who get a headache after it or pain in the eyes. Assuming this is not due to defective ventilation, the patients' refraction and the balance of the ocular muscles should be carefully investigated. This will relieve many of them. There is, however, a class of patient whose eyes do not trouble them much in the ordinary way, but who have a great deal of trouble after going to a cinema. They do not want to go to the expense and trouble of further examination of their eyes. Such patients may be told to experiment a little as to the particular cinema they go to, and particularly the seat they occupy. A medical friend, a very careful observer, told me that if he occupied a seat in the centre of the hall on the ground floor, which in this particular hall allowed him to look straight at the centre of the screen without having to raise or lower the eyes, he suffered no discomfort. If he sat at the sides or further back, his eyes troubled him very much. The hall had a floor which sloped towards the screen, so that from the back seats, which were the most expensive, the screen could be seen without raising the eyes. This ease appears to indicate that some people at least, in addition to selecting a seat which complies with the recommendation of the Committee, should consider carefully the question of its distance from the screen.—A. E. J. L.]

J. A. Wilson[14] thinks that the centre of irritation is in the retina ; that in dark adaptation the retina is more sensitive to dim lights, probably more sensitive in every way, resenting coarse flashes of light and ill-defined uncertain images. He suggests raising the standard of lighting in the hall and on the screen, that the pictures should be as steady as possible, and that the hall should be brilliantly lit in the intervals.

Papillœdema and Optic Neuritis.—W. T. Davis[15] writes that although the more careful students of conditions of the optic nerve head seek to discriminate sharply between œdema commonly due to increased intra-ocular pressure and inflammation arising from many different causes, there is great confusion in the literature. Many writers attempt no separation of cases into the two classes, or imply that it is a matter of merely verbal or academic importance. Often the heading neuritis is found to refer to a case of choked disc, or the latter term is applied to a condition presumably inflammatory in origin.

Behr,[16] writing on the differential diagnosis of choked disc and optic neuritis in the early stages of their development, sums up the chief differences thus :

Choked Disc.	*Papillitis.*
No disturbance of visual acuity or fields	Often impaired vision and scotoma
Normal dark adaptation	Great disturbance of dark adaptation
Nerve fibres transparent	Clouded or hidden disc margin
Choroidal margin visible	Lamina invisible
Lamina cribrosa visible	Vessels obliterated, or covered in clouded papillary tissue
Physiological cup retained	
Vessels lie on swelling	Abundant white vessel sheaths perceptible
Perivascular space invisible	

Shifting as an Aid to Vision.—Bates,[17] in an article which should be read in the original, calls attention to the value of shifting the eyes as an aid to vision, especially in weak or ametropic eyes. He says it is impossible for the eye to fix for more than a fraction of a second. If it tries to do so, it begins to strain and the vision is lowered. This can be demonstrated by trying to hold one part of a letter for an appreciable length of time. It rapidly blurs, and sometimes the effort produces pain. The normal eye never attempts to hold for more than a fraction of a second. By learning to shift and swing their eyes, persons, no matter how great their error or refraction, correct it partially or completely, as demonstrated by the retinoscope, for at least a fraction of a second. Bates claims that by this method of alternately resting the eyes, by closing them or shading by the palms of the hands and by learning to shift and swing the eyes, persons with very imperfect vision have obtained a temporary or permanent cure of their symptoms in a few weeks.

Influence of Age on the Static Refraction of the Eye.—Landolt[18] points out that though the static refraction of the eye is less in old age than in youth, there are exceptions to the rule, in which the static refraction, instead of being diminished, may undergo augmentation with advancing years. He cites two cases : (1) An emmetrope who, having become presbyopic at about 50, developed myopia, reaching 6 D in amount by the time he was 70 and requiring a concave glass of 3 D in order to see distinctly at 30 cm. ; (2) A hypermetrope of 3 dioptres, who became emmetropic in the same number of years. This increase in refractive power is not due to elongation of the eyeball, but to increase in refractive power, probably of the lens. [Such cases are well-known to ophthalmologists. If the change does not equally affect both eyes, as was the case in a patient of ours, great trouble may result. This condition has considerable importance for the general practitioner, who is frequently called on to prescribe glasses—for presbyopia especially. Occasionally such patients are bedridden, and a test of the distant vision is not easily made. In such cases, one accustomed to the usual amount of presbyopia which experience tells one to expect might be very puzzled unless one remembered the existence of such cases.—A. E. J. L.]

Heterophoria in Presbyopic Patients.—Maddox, in the Doyne Lecture at Oxford, not yet published, called attention to a point of practical value to practitioners, many of whom are called on in country practice and elsewhere to prescribe for presbyopia. Such cases, Maddox says, frequently come back dissatisfied with their glasses. One reason is that many people have some degree of exophoria—a tendency of the eyes to diverge slightly. Now if too strong a convex lens is given for reading, the image is brought nearer to the eyes than they like, and they must converge to see it. If the effort required is a considerable one, a feeling of strain and discomfort results after a short time. Maddox has invented a most useful instrument for testing such errors called the 'wing test', to the value of which we can testify from experience. [Our experience is also that these cases are quite common, and that such patients are often given a correction for presbyopia which, though in accordance with the amount usually taken, is too strong for them. A reduction of the strength of the lenses gives great relief. Practitioners cannot keep special instruments for occasional use; if then they are in doubt, it is better to err on the side of under-correction, as a slight increase will carry the patient on at least for a time, whereas an over-correction causes trouble.—A. E. J. L.]

Iritis.—Dianoux[19] in one case saw improvement in twenty-four hours after the use of **Aspirin.** The general results have been strikingly good. He advises giving 3 grm. in one dose.

Prolapse of the Iris due to injuries is fairly common, and practitioners abroad and in outlying districts may be called upon to treat them. Goulden[20] says that reposition of the prolapsed iris should be avoided, as it may lead to infection, and it is also useless, as the iris will prolapse again. The iris should be excised, but great care should be taken to clear the wound of uvea, as, apart from lesser troubles, the danger of iridocyclitis and sympathetic ophthalmia will be avoided. A general anæsthetic should be given. The diagrams (*Figs.* 27–32) indicate the method of dealing with the condition. [From personal experience we can testify to the value of conjunctival flaps in such conditions. They are easy to make and most effective.—A. E. J. L.]

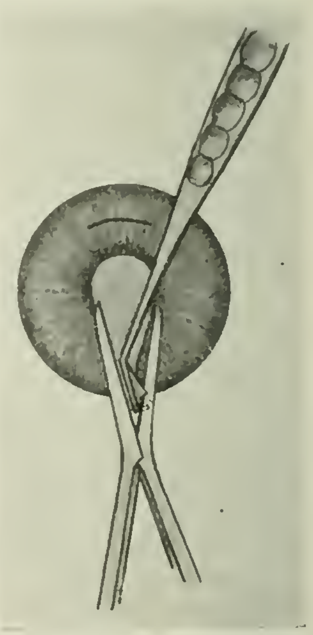


Fig. 27.—Showing the method of using Couper's capsule forceps in seizing the prolapse of iris along its whole length. In the upper part of the cornea is shown the incision recommended for the use of the repositor in difficult cases.

Snow Blindness.—E. L. Atkinson[21] has an interesting article on snow blindness. Rays from the violet end of the spectrum are apparently the cause of the condition. Red and amber glasses which definitely cut out the violet and ultra-violet end of the spectrum give efficient protection. **Hemisine** or **Adrenalin Chloride** 1–1000 dropped into the affected eye, was found to be the

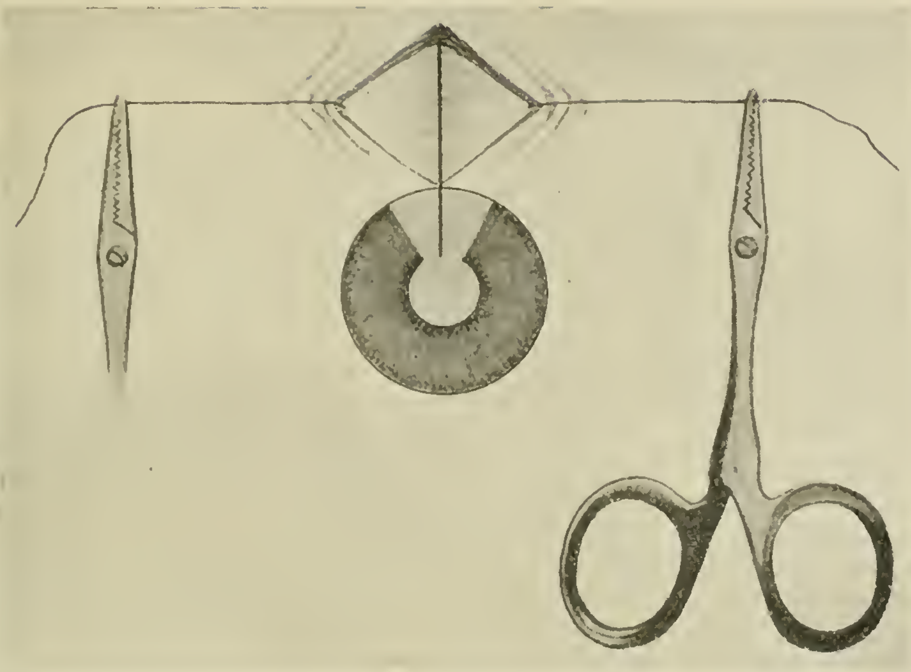


Fig. 28.—Showing the method of exposing a wound in the sclera by retracting the conjunctiva so as to deal with the uvea prolapsed.

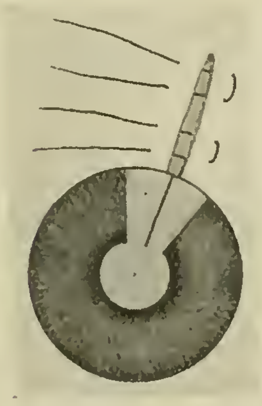


Fig. 29.—Showing the method of inserting sutures in the conjunctiva after dealing with such a case as that shown in *Fig.* 2.

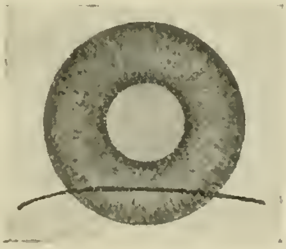


Fig. 30.—Showing an incised wound which extends not only through the cornea but also involves the sclera on either side.

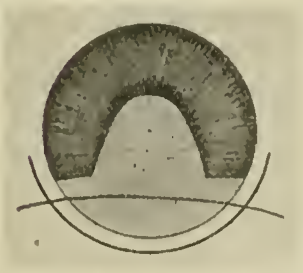


Fig. 31.—Showing the wound freed of sclera and the incision to be made round the cornea so as to detach the conjunctiva.

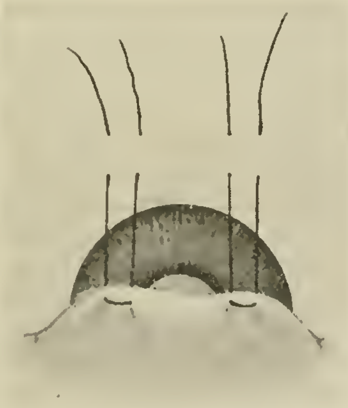


Fig. 32.—Showing the manner of drawing the conjunctiva across the cornea so as to bury a wound such as that shown in *Fig.* 31.

best treatment. A. W. Ormond[22] says snow blindness is due to invisible rays at the blue end of the spectrum. The symptoms are those of a severe conjunctivitis with superficial ulceration of the cornea. Glasses made of Crookes' glass are recommended as a protective measure.

Sympathetic Ophthalmia.—H. Moulton[23] gives his experience in treating three cases of sympathetic ophthalmia with large doses of **Sodium Salicylate.** He follows Gifford's method of giving one grain of the salicylate for each pound of body-weight of the patient, taken in the course of ten to fourteen hours. The full dose is apparently given for five days or so, then a rest is given, and it is continued in the same or diminished doses for a further period. The patients are kept in bed, which helps to avoid depression. In all three cases the patients were benefited or cured.

Eye Affections due to Tobacco.—A layman frequently asks a doctor, "Does tobacco injure me, and is it harmful to my eyes ?" P. C. Jameson[24] answers the question. Tobacco, he says, must be regarded as a poison if used in any considerable amount ; and it is the general opinion that it is always harmful to the young, being more injurious to immature cells.

Cantonnet[25] says that visual affections due to the abuse of alcohol, with which tobacco is almost always associated, are of special interest to the general practitioner, because the nature of the malady may often be suspected without any ophthalmoscopic examination, and also because the treatment is medical. Treatment adopted early cures completely, and even when started late in the disease is of great value. The patient sees badly in the distance, but notices he *sees better in a moderate light.* He sees very badly often at midday when the sun is shining, and much better in the evening. This is due to his having a central scotoma ; when the pupil dilates, the light falls on the retina outside the damaged portion, and so he sees better. There is the inability to recognize small discs of red and green. The patient may notice he cannot see the red tip of a match.

One of his patients was a Turk who took no alcohol. He was said in his own country to have been suffering from optic atrophy for three years, but recovered completely. In addition to rigid abstention from alcohol and tobacco, Cantonnet says that the use of **Organic Phosphorus,** by the mouth and subcutaneously, is of great value. The use of suitable glasses during convalescence is also a great help to the patient.

Hine[26] describes a case in which the vision was reduced to $\frac{6}{60}$ in a woman of 51, due to smoking cigarettes. Her husband used to make her shag cigarettes when he was smoking a pipe. A cure resulted soon after giving up all smoking.

[Sir William Lister permits me to mention a very interesting case of his. A nurse developed retrobulbar neuritis. She saw various oculists, but no cause was found, and it did not yield to any treatment. It was then discovered she was smoking eight Virginian cigarettes a day. The stoppage of these led to complete recovery. The experience of the writer is that in some cases, particularly in neurasthenic patients, even the moderate use of tobacco aggravates the symptoms of asthenopia. Occasionally patients are met with whose errors of refraction are perfectly corrected, but who still have trouble, particularly in the enervating climate of the East. A reduction of the amount of tobacco consumed in such cases is often of marked benefit, though such advice is always displeasing and usually disregarded.—A. E. J. L.]

Quinine Amblyopia.—Traquair[27] publishes three cases of quinine amblyopia after comparatively small doses of quinine. In the first, the patient took 2 to 3 gr. daily for three weeks and then was given 20 gr. in one dose. Sight was promptly lost and remained so for a week. Eight months later, the pupils showed a tendency to dilatation, the fields were contracted; there was optic atrophy with contraction of the retinal vessels, and the light sense was severely impaired. In the second case, 15 gr. of quinine-urea hydrochloride were given every four hours for about thirty-six hours, a total of 120 gr. being taken. Total blindness supervened in a few hours; sight began to return in eight days. Three months later the fields were much contracted, the discs pale, and the condition very unsatisfactory. In the third case, 2 to 5 gr. of quinine were given in a cachet, every four hours for one night. Two or three days later, the patient was found to be blind. The total dose of quinine consumed in the twelve hours was estimated to be less than 20 gr. Two months later the fields were contracted and the discs were pale. A month later still, constriction of the retinal vessels was added to the other ophthalmoscopic signs, the fields were greatly contracted, and the patient had great difficulty in reading. Elliot,[28] criticizing the above, says that a comparatively large number of men who have been returned to civil life, reported to be none the worse for malaria and its treatment, really have contracted fields, deficient light sense, and are severely handicapped thereby. The records of published cases suggest that some of these will get worse as time goes on. [We think it well to bring these cases to the notice not only of practitioners abroad, but of those at home, as there are thousands of soldiers who have had malaria, scattered through the land. It would be well to inquire if they have suffered at all as regards their sight since the original attack of malaria; if so, to have it investigated, and if not due to ordinary causes to exercise caution in the giving of quinine. Malaria, however, is a serious disease, and often highly resistant even to large doses of quinine. Everyone, therefore, who has practised in the tropics knows that to discontinue the quinine when 'ringing in the ears' develops, as has been suggested, is a counsel of perfection which cannot be followed. Still, a warning such as Traquair gives is very valuable, and should put practitioners more on their guard against the very serious danger which may result from quinine. As, however, the giving of an adequate amount of quinine may be a matter of life and death to the patient, the physician must obviously be the judge of the actual treatment required.—A. E. J. L.]

Evans[29] describes two cases in which temporary blindness followed the drinking of large quantities of a proprietary quinine tonic. Both finally recovered good vision in ordinary light, but in reduced illumination could hardly get about the room. Kirkpatrick[30] describes three cases of optic atrophy due apparently to quinine. In one of these, the man swallowed the quinine in mistake for Epsom salts.

Care of Artificial Eyes.—With so many pensioners wearing artificial eyes, this matter has become an important one. Davidson[31] gives the experience of his father, who has worn an artificial eye for thirty years, and has only had to renew it on account of breakage. No discoloration or dullness has ever occurred. He attributes the ease, comfort, and freedom from irritation to the following simple practice. It consists in placing a little absorbent wool into the concavity of the eye and then smearing a very small quantity of a weak white boracic ointment on that part of the surface of the wool nearest the large end of the eye, so that when the latter is in position the ointment is nearest to the source of lachrymal secretion. When the eye is removed at bedtime the wool is found quite saturated with fluid. The eye is placed in a small receptacle containing cold water, and kept there till next morning, when the wool and ointment are renewed. Davidson strongly recommends this procedure. The advantages are avoidance of lachrymation and its ill effects, preservation of the lustre of the eye, increased motility of the eye, and avoidance of irritation of the conjunctiva owing to the lubrication.

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EYE, GENERAL THERAPEUTICS OF.

Lt.-Col. A. E. J. Lister, I.M.S.

An annotation in the *British Journal of Ophthalmology*,[1] reviewing some of the results of treatment by an **Abscess of Fixation**, says the reports of it are sufficiently emphatic to call for an extended trial of this method in the destructive forms of iridocyclitis. Van Lint[2] has applied it especially to the treatment of intractable uveitis and sympathetic ophthalmia : several cases of the former and four of the latter disease. He gives details of two cases of iridochoroiditis in which it was of striking benefit, after the usual forms of treatment had failed. A cubic centimetre of spirit of turpentine is injected subcutaneously. Van Lint believes the abscess of fixation is a valuable therapeutic remedy in such conditions.

Illig[3] uses for *local anæsthesia* a weak **Novocain** solution, 0·3 per cent, to to which is added 0·4 per cent of **Potassium Sulphate** and 2 drops of **Adrenalin** to 5 grm. of the solution. He gives retrobulbar injections for exenterations and enucleations. He states that 3 c.c. of this solution suffices. Its use is free from danger and no pain is felt. In nervous patients he gives an injection of scopolamine or morphine twenty-five minutes before operation, and waits twelve minutes after injecting the novocain before operating. The conjunctiva is first anæsthetized by a 5 per cent solution of cocaine.

Gil[4] has modified Seidel's method of injecting the local anæsthetic in removal of the lachrymal sac. Instead of injecting the anæsthetic through the eyelid and also through the skin below the orbit, as in Seidel's technique, he makes the single injection in the conjunctival sac, after cocaine, just above and beyond the lachrymal caruncle, introducing the needle for 2·5 cm., following the inner wall of the orbit to a point behind the bifurcation of the naso-ciliary nerve.

Bedell[5] writes of the value of **Ethylhydrocuprein** (a derivative of quinine) especially in pneumococcic and other infective conditions of the eye. He says that he has seen a case of acute dacryocystitis cured in four days by the use of a 1 per cent solution every four hours. It is of use in spring catarrh, corneal ulcer, and phlyctenular disease. Gradle[6] says the solution must not be more than four days old. Patton[7] applies the powder direct to the ulcer in a severe pneumococcic case, and massages it into the surface of the ulcer. This was effective where other methods of treatment had failed

Cecchetto,[8] on an experience of 59 cases of *gonorrhœal ophthalmia*, concludes that instillation of **Antigonococcic Serum** without other local treatment does not cure promptly. The majority of cases, however, are cured by vaccines without any other treatment in a few days, without affection of the cornea resulting. A cure of the vulvo-vaginitis or urethritis results also in most cases.

Terrein, Debré, and Paraff[9] found that injections of an emulsion of gonococci produced acute iridocyclitis in a rabbit. Injection of specific serum 24 hours before into the anterior chamber influenced the condition most favourably. Injection of the serum intramuscularly, intravenously, or subconjunctivally is without effect. The preventive power of the serum is doubtful.

Kleckowski[10] has used a mixture of **Aniline Colours** in gonorrhœa, of which the bactericidal power has been studied *in vitro* by Roemer. His mixture consisted of brilliant green 1–5000, iodine green 1–400, malachite green 1–660, gentian violet 1–200, Holmann's violet 1–200, methyl violet 1–200, and methyl blue 1–100. The conjunctival sac is first washed out, and the mixture is then applied by opening the lids with a retractor and pouring it in. The cornea is kept submerged for about two minutes.

The discharge ceased in about six days in the case of infants, and fourteen days in adults. The longer period in the latter he thinks is due to mixed infection; streptococci or pneumococci being often present. He considers that the treatment shortens the course of the disease very markedly as compared with other methods.

Idiosyncrasy as regards Drugs applied to the Eyes.—T. H. Butler[11] ordered a patient, age 50, ¼ per cent solution of sulphate of zinc with yellow oxide of mercury ointment 1 per cent, for chronic conjunctivitis and blepharitis. Severe eczema resulted, which was cured by discontinuing the ointment and keeping on with the zinc lotion. In another case one drop of holocaine, which was used in the eyes of an elderly lady, with a view to taking the tension with a tonometer, caused intense pain. He was called to see her in the evening and found her ill in bed, with vomiting and diarrhœa. Both eyes were much inflamed, and there was a mucoid discharge. Several days elapsed before the lids became normal. The solution was not a fresh one and contained a little chloretone, but was used in a similar case the same afternoon, without ill effects. Butler remarks that the patient was very angry with him. [This we can well believe. We have used holocaine for years, but without the addition of chloretone, with no ill effects; but it is well to know of such cases as this, as under certain conditions of practice the effects might be very unpleasant.—A. E. J. L.] Butler says that he found chloretone, used as a preservative for certain lotions, to cause pain. He quotes another case, where a patient became very giddy and faint after the use of cocaine, to allow of the use of the tonometer, followed by a drop of eserine. Neither cocaine nor eserine alone caused the trouble.

Butler makes the pertinent suggestion that we should be on the look-out for such peculiarities, especially if patients say they react abnormally to certain drugs.

Hochgurtel[12] reports three cases of general intoxication following the instillation of a solution of homatropine. The patients were 74, 12, and 10 years of age. In the oldest patient, the symptoms appeared ten minutes after the instillation of a 10 per cent solution into the conjunctival sacs, and the other cases occurred after the second drop had been used. The symptoms were alarming in all of the cases. All were extremely restless, had dilated pupils, an expression of anxiety, and flushed face. In one of the cases there was rigidity of the neck muscles.

Lancaster, Burnett, and Gaus[13] write very favourably of the use of **Mercurochrome-220** in *infective conditions* of the conjunctiva and cornea. Chemically, it is a compound of fluorescein and mercury, the idea being to combine the penetrating effect of the dye with the germicidal effect of the metal, at the same time avoiding the irritating effects of the mercurial compounds ordinarily in use. It has been favourably reported on by urologists in disease of the genito-urinary tract. In acute infections of the conjunctiva a one or two per cent solution of mercurochrome-220 was instilled, from one to several drops at a time, from three to ten times a day. The authors state that a more rapid reduction of discharge takes place than under zinc sulphate, boric acid, or mercuric chloride, which drugs they usually employ. It proved very useful in pneumococcic ulceration of the cornea in conjunction with the use of the actual cautery. In ophthalmia neonatorum of both gonorrhœal and non-gonorrhœal origin, its use contrasted very favourably with the best of other methods of treatment. Two applications of a 10 per cent solution were first given every two hours, and after that a 5 per cent solution was used two-hourly.

T. B. Holloway and A. G. Fewell,[14] in a preliminary report, speak very favourably of **Mercurophen** (sodium mercury-orthonitrophenolat). It was found to be 200 times more active than perchloride of mercury when used in a menstruum rich in protein, such as serum. It sterilized the hands efficiently in a dilution of 1–40,000 after an exposure of one minute. It does not corrode metal. It appears to be particularly efficient against the pneumococcus. Lachrymal-sac cases clear up very quickly when treated with it.

Heine,[15] encouraged by the excellent results obtained in diseases of the anterior part of the eye by **Milk Injections**, has tried it in disease of the retina and choroid. He tried it in a series of cases of *albuminuric retinitis*, with very good results. He gives details of a number of cases which are worth studying by those interested. He lays stress on the point that, as the last months of these cases are very often saddened by blindness, anything which will avert this is of great value. Zimmerman[16] has used milk injections with success. In one case the injection caused a rash which was diagnosed by a dermatologist as measles. It was, however, a protein rash and disappeared next day. He gives an average dose of 5 c.c., injected subcutaneously in the gluteal region. Stocker[17] injects milk into the loose skin of the abdominal wall, using from 3 to 12 c.c. He keeps the patient in bed till fever subsides. Uddgun[18] injects milk subconjunctivally as well as intramuscularly. Marin[19] uses goat's milk, as he cannot get cow's milk easily. Kraupa[20] tried injections on 100 patients suffering from *tuberculous affections* of the eye. The results were better than those obtained by partial antigens. He thinks the effect is to set free, in some unknown way, protective powers that are present.

Van Lint[21] very strongly recommends the injection of milk as a *prophylactic measure* in cases of iridectomy with posterior synechiæ, extraction of secondary cataract, or cases where one has reason to fear post-operative troubles. He says the results are remarkable, and that cases in which an operation was followed by acute inflammation have been operated on a second time without trouble after an injection of milk. He injects 5 c.c. of ordinary freshly-boiled milk into the buttock. He suggests care in cases of pulmonary tuberculosis, as reaction has occurred in the treatment of tuberculous iritis.

Lacroix and Fontain[22] report a series of cases of *neuroretinitis* and *retrobulbar neuritis* treated by **Novarsenobenzol**; **Mercury** and **Iodide of Potash** being also given. They consider this the best method of treatment. They agree with Milian[23] that the bad results during treatment with arsenical compounds are more often due to syphilis than to the arsenic given.

Gonzalez[24] has obtained splendid results in an epidemic of *night blindness* after all other means had failed, by giving **Liver**. In his opinion the liver of the ox possesses an internal secretion, by means of which a hormone is produced which excites the formation of visual purple. He considers night blindness as indicative of defective hepatic activity.

H. Lauber[25] writes of striking improvement observed after **Sugar Injections** in cases of *neuroretinitis* in arteriosclerosis of renal origin, in *vitreous affections* following severe rheumatic iritis, and in *iridocyclitis* of tuberculous origin. A 25 per cent solution of sugar was used. He suggests this may be a valuable means of promoting the absorption of intra-ocular exudates. Several other authors have written of the value of sugar injections.

Weigelin[26] analyzes the results obtained by treating 77 cases of *tuberculosis* of the eye with **Tuberculin.** His experience is that it is of value, and especially in severe forms of the disease.

REFERENCES.—[1]*Brit. Jour. Ophthalmol.* 1920, 129; [2]*Arch. d'Ophtalmol.* xxxvi, 621; [3]*Arch. f. Augenheilk.* lxxx, 54; [4]*Semána méd.* 1920, June (abstr. *Jour. Amer. Med. Assoc.* 1920, 1458); [5]*Jour. Amer. Med. Assoc.* 1920, 1927; [6]*Ibid.*; [7]*Ibid.*; [8]*Arch. di Ottal.* 1920, 69; [9]*Arch. d'Ophtalmol.* 1921, 390; [10]*Przeglar Lekarski*, 1920 (abstr. *Rev. gén. d'Ophtalmol.* 1920, Nov., 502); [11]*Brit. Jour. Ophthalmol.* 1921, March, 118; [12]*Zeits. f. Augenheilk.* xli (abstr. *Ophthal. Literature*); [13]*Jour. Amer. Med. Assoc.* 1920, Sept., 721; [14]*Amer. Jour. Ophthalmol.* 1920, Oct., 765; [15]*Münch. med. Woch.* 1920, Oct., 1221; [16]*Amer. Jour. Ophthalmol.* 1921, 21; [17]*Ibid.* 1920, 58; [18]Stockholm, 1918 (abstr. *Ophthal. Literature*, 1920); [19]*Rev. Cubana de Oftal.* ii, 168 (abstr. *Ophthal. Literature*, 1920); [20]*Zeits. f. Augenheilk.* xlii, 105; [21]*Arch. d'Ophtalmol.* 1921, Dec., 589; [22]*Ibid.* 1920, Sept., 544; [23]*Ibid.* Jan., 1912; [24]*Ann. de O. Mex.* ii, No 7, 152; [25]*Wien. klin. Woch.* 1921, No. 4, 35; [26]*Klin. Monats. f. Augenheilk.* 1921, 647.

FACE, AFFECTIONS OF. (*See* MOUTH AND FACE.)

FÆCES. (*See* INFANT FEEDING.)

FAMILIAL HÆMORRHAGES IN SKIN AND MUCOSÆ.

E. Graham Little, M.D., F.R.C.P.

Goldstein[1] gives a full summary of previously reported cases of this rare disease, and himself records a new case, his patient being a woman, age 42, with telangiectases on the nose, nasal septum, lips, tongue, cheek, neck, and middle finger of left hand, with a history of profuse epistaxis. A careful inquiry led to the discovery that 11 members of the patient's family suffered in the same way. There was no history of hæmophilia. The blood-count showed a slight diminution of red cells and a slight increase of white corpuscles (14,000), 68 per cent hæmoglobin, differential count practically normal.

Treatment is almost useless in controlling the hæmorrhages, but the telangiectasis, when established, may be treated with some success with freezing by **Carbon Dioxide Snow,** with the **Chromic Acid Bead, Electric Needle,** etc.

REFERENCE.—[1]*Arch. of Internal Med.* 1921, Jan., 102.

FEMUR, UNUNITED FRACTURE OF NECK. (*See* ORTHOPÆDIC SURGERY.)

FILARIASIS.

Sir Leonard Rogers, M.D., F.R.C.P., F.R.S.

G. C. Low and Elizabeth J. O'Driscoll[1] record a case of *Filaria loa* infection in which the reversal of the sleeping habits of the patient had no effect in reversing the periodicity of the embryo filaria in the peripheral blood, while a total of 25 gr. of **Tartar Emetic** intravenously produced only a temporary diminution of the parasites in the blood. The same workers[2] also record a single case of *Filaria bancrofti*, treated in London, in which 17½ gr. had no beneficial result. On the other hand, H. B. Day,[3] working in an endemic area in Egypt, records that he has confirmed the experience of L. Rogers that in the treatment of filariasis a large amount of antimony is necessary to reduce permanently the numbers of microfilariæ in the circulation; and P. N. Das,[4] with the great mass of material available in the Orissa province ofIndia, records further successful use of tartar emetic in filarial disease in continuation of Rogers' work there; he showed that on the average about 124 c.c. of a 2 per cent solution of antimony tartrate in about 26 injections were required to produce a great reduction or complete disappearance of microfilariæ from the peripheral blood.

J. W. W. Stephens[5] records some statistics of filariasis worked out from Manson-Bahr's notebooks of work in Fiji in 1912, and concludes that microfilariæ are commoner in those with than without filarial disease, and vice versa; but that there is no evident correlation between various microfilaria rates and the corresponding filaria disease rates. F. G. Rose[6] records the results of a careful investigation of filariasis in British Guiana, where no less than 21 per cent of the population were found to be infected, while the use of Smith and Rivas' method—washing and centrifuging 10 c.c. of blood collected in 2 per cent acetic acid—would doubtless raise that figure. The disease appears to be on the increase, 20 to 25 per cent of the school children of Georgetown being infected, where 7·4 per cent of culices were found to contain developing larvæ, chiefly in *Culex fatigans*, so that an anti-mosquito crusade is the chief prophylactic measure. He puts forward an ingenious if highly technical theory to account for filarial periodicity—namely, that the sheath of the embryo may vibrate, and so become detached from its resting-place in the lungs, in response to the 'pitch of the fundamental note' produced by the culex or stegomyia in which it develops. He also lays stress on the importance of secondary *Streptococcus pyogenes* infections in filariasis, and refers to their treatment by **Vaccines** in 484 cases with encouraging effects, detoxicated vaccines giving the best results.

Filaria Medinensis.—Macfie[7] records further good results from the intravenous injections of **Tartar Emetic** in this infection, giving intravenously a $\frac{1}{2}$ per cent solution freshly prepared, a total of 4 gr. generally killing the adult worms and their embryos, while 1 gr. every other day to a total of 6 gr. is advised to make sure. A table of 23 cases is given, with an illustration showing the gradual absorption of the worm just under the skin. A striking feature is that after the injections portions of the dead worms can be extracted without inflammation being set up, while any present rapidly subsides.

References.—[1]*Lancet*, 1921, i, 798; [2]*Ibid.* 221; [3]*Ibid.* 525; [4]*Ind. Jour. Med. Research* (Sci. Congress No.) 1920, 44; [5]*Ann. Trop. Med. and Parasitol.* 1921, Feb. 8, 341; [6]*Lancet*, 1920, ii, 1197; [7]*Ann. Trop. Med. and Parasitol.* 1920, Nov. 27, 137.

FINGER-JOINTS, STIFF. (*See* ORTHOPÆDIC SURGERY.)

FINGERS, INJURIES OF.

Sir W. I. de C. Wheeler, F.R.C.S.I.

The accompanying illustration (*Fig.* 33) shows the treatment of injuries to the fingers recommended by Davis, and described in the MEDICAL ANNUAL, 1916, p. 246. The rationale of the treatment is to preserve all tissues possible in order to save the terminal portion of the digits. An attempt is made to stimulate the growth of granulation tissue on the end of the stump, and in some way to confine this growth to a desired size and direction. After a number of experiments, Davis advised that sheet **Celluloid** $\frac{1}{200}$ in. thick would be best for the purpose; but the writer [W. I. de C. W.] finds that the celluloid material used by Wright for the hypertonic salt treatment of wounds acts admirably. The stump is cleaned with tincture of iodine, the shaped piece of celluloid is soaked in mercuric chloride (1–1000) and is sponged over with ether or alcohol. It is then wrapped round the finger in the form of a tube and secured with narrow adhesive strips. In cases seen early a blood-clot is allowed to form in the tube, which serves as a scaffold for granulations. Any desired medication may be applied to the wound after the celluloid has been placed in position. Building new tissue on the end of the stump is slow, but in the end it will preserve and cover the end of the bone, and also add materially to the length of the stump. If the joint is uninvolved, even a short bit of terminal phalangeal bone will form the basis for a shortened phalanx which may be voluntarily extended and flexed and prove of great use to certain skilled workmen.

In the case illustrated, the thumb was completely blown away, the palm was lacerated, and the tips blown off the fingers. The end-result was excellent.

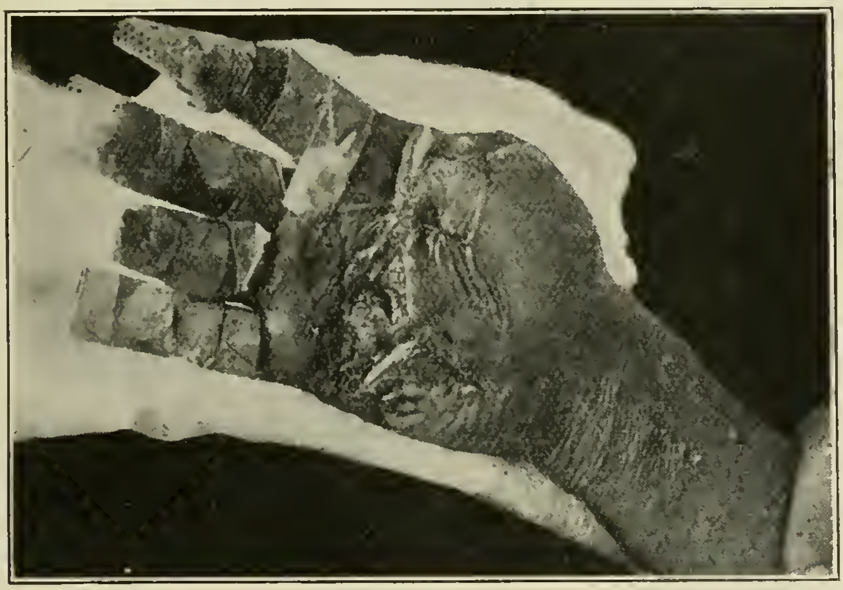


Fig. 33.—Conservation of terminal phalanges by training the growth of granulation tissue in celluloid tubes. (*Wheeler.*)

The patient was urged to allow an attempt at transplantation of a thumb after the method of Joyce,[1] but he refused operation.

REFERENCE.—[1]*Brit. Jour. Surg.* 1918, Jan., 499.

FISTULA, VESICO-INTESTINAL. (*See* BLADDER, DISEASES OF,)

FLAT-FOOT. (*See* ORTHOPÆDIC SURGERY.)

FOOD AND FOOD CONTROL.

Joseph Priestley, B.A., M.D., D.P.H.

Food Control.—The Sale of Food Order 1921 is important, as it standardizes certain articles of food and brings them under the administration of the Food and Drugs (Sale of) Acts. The foods are dripping, jam, marmalade, and milk. A maximum percentage for water in lard is also laid down, viz., 0·5. In the case of jams, there are to be the usual declarations as to composition and weight and, in addition, the following standards: (1) water soluble extract of jam (65 per cent minimum), and (2) added fruit-juice (10 per cent maximum). The composition of marmalade is standardized, whilst, in regard to milk, the addition of colouring matter is prohibited, the term 'milk' including skimmed and separated varieties.

Food Transport.—The Departmental Committee of the Ministry of Health, appointed to investigate the methods of food transport, has reported, and many important, though long delayed, reforms are set out in the Report. The handling of meat in the public markets, and its previous contamination during transit, e.g., by train, canal, ship, or road, have again and again formed texts for sanitary reformers. Delayed on route, carried in dirty uncovered trucks, ship holds, canal barges, or carts, the marvel is that more contamination of meat has not hitherto resulted, and that an outraged public has not brought pressure to bear upon the authorities responsible for such gross negligence.

The high cost of freightage is no less serious. A large amount of evidence was taken, and the whole question was considered from every point of view, e.g., farmer, wholesale dealer, retailer, transport firm, etc. The net result of the Committee's deliberations is a recommendation that regulations should be made under the Public Health (Regulations as to Food) Act 1907, so as to enforce the use of cleanly methods in regard to the transit of meat by road, and to empower the authorities which control public abattoirs and wholesale markets to enforce cleanliness in connection with the distribution of meat from rhose establishments.

FOOD SENSITIZATION. (*See* Non-specific Protein Therapy.)

FOOT, SURGERY OF. (*See also* Orthopædic Surgery.)

Sir W. I. de C. Wheeler, F.R.C.S.I.

A. K. Henry[1] describes a case of disability associated with a *congenitally separate tuberosity of the tarsal scaphoid.* The condition of separation was bilateral, but in the painful foot the additional ossicle was elongated, sharply hooked, and pointed, while in the painless foot it was smooth and conical. He suggests that the presence of an abnormal ossicle in a specially stressed region of the foot constitutes a place of diminished resistance, particularly when it is possible that a joint-cavity between the ossicle and the scaphoid may be involved in the stress.

Reference.—[1]*Dublin Jour. Med. Sci.* 1921, Oct.

FORDYCE'S DISEASE. *E. Graham Little, M.D., F.R.C.P.*

Margolies and Weidman[1] undertook a statistical inquiry into the incidence of the affection known as Fordyce's disease, and found by examining groups of persons of the same age—e.g., students at school, the occupants of children's hospitals, older patients in hospital, etc.—that 70 per cent of persons above the age of puberty exhibit the typical lesions, so that the condition can hardly be considered pathological. Histological study of 14 post-mortem human cases and 3 monkeys, convinces the authors that the lesions are produced by a simple embryonic displacement of sebaceous glands, which increase in size at puberty *pari passu* with the general hair and sebaceous glands.

Reference.—[1]*Arch. of Dermatol. and Syph.* 1921, June, 723.

FOREIGN BODIES IN AIR- AND FOOD-PASSAGES. (*See* Endoscopy, Peroral.)

FOURTH VENEREAL DISEASE. *Col. L. W. Harrison, D.S.O.*

Donovan[1] describes a case of *ulcerative and gangrenous balanoposthitis* which has so far received comparatively little attention. [A good description of the condition is to be found in McDonagh's *Venereal Diseases: their Clinical Aspect and Treatment*—L. W. H.] It is an acute inflammatory disease of the glans penis and mucous surface of the prepuce, with ulceration, sometimes gangren , and a copious flow of strongly odorous pus, and is said by the author to be due to a spirochæte in association with a fusiform bacillus. Bataille and Berdal,[2] describing 120 cases, state that it comprises 2 to 3 per cent of cases seen at l'Hôpital du Midi. They proved its contagiousness by inoculation of the pus on the healthy glans. The organisms are similar to the two forms seen in Vincent's angina, and may possibly be identical.

In its ulcerative form exfoliation of epithelium in numerous spots is followed by irregular, somewhat punched-out, bright-red ulcers with a whitish margin of necrosed epithelium. Later the ulcers become deeper, and covered by a greyish-white membrane. In the gangrenous form the ulceration proceeds to death of the tissues; the whole penis may be involved and require amputation. The incubation is from two to eight days. The treatment recommended is: (1) Dorsal slit; (2) Irrigation of the sac every few hours with hydrogen peroxide; (3) Application to the ulcers of '606' or '914' in powder form each day.

REFERENCES.—[1]*Amer. Jour. Med. Sci.* 1921, Feb., 267; [2]*Modern Med.* 1891, ii, 340, 380, 400, 413.

FRACTURES. (*See* ECCHYMOSIS; ORTHOPÆDIC SURGERY.)

GALL-BLADDER AND BILIARY PASSAGES, DIAGNOSIS OF DISEASE OF.

Robert Hutchison, M.D., F.R.C.P.

The following summary of the history, symptoms, and physical signs in the chief diseased conditions of the gall-bladder and biliary passages is taken from a paper on the subject by Lewellys F. Barker:—

1. *Acute Cholecystitis (Mild).*—Mild 'indigestion'; slight pain and tenderness in the right hypochondrium; sometimes, a palpable gall-bladder; slight fever and slight polymorphonuclear leucocytosis; symptoms often subsiding in a few days on rest in bed, light diet, and local thermotherapy.

2. *Acute Cholecystitis (Severe).*—Symptoms more severe than in the preceding; nausea and vomiting common; gall-bladder distended and very painful on palpation as a rule; upper right rectus rigid; leucocytosis of from 12,000 to 20,000; fever; sometimes chills, especially if exudate is seropurulent; signs of peritoneal irrigation; need of immediate operation. If the patient is very toxic, the gall-bladder may be gangrenous. The condition may be mistaken for acute appendicitis or for acute peritonitis due to perforation of a gastric or a duodenal ulcer.

3. *Chronic Cholecystitis, with or without Gall-stones.*—Attacks of 'indigestion' or 'biliousness' ('gall-bladder dyspepsia', 'inaugural symptoms') with fullness, weight, and distention after meals, relieved by belching, but often followed by soreness and stiffness in the right hypochondrium lasting a few days. Sometimes there are characteristic attacks of biliary colic, most often nocturnal, with severe pain in the epigastrium and in the right hypochondrium, radiating to the back and often to the right shoulder, accompanied by gaseous distention and often by vomiting, and not infrequently requiring morphine for relief. The gall-bladder may or may not be palpable (it is often shrunken). Tenderness on pressure in the gall-bladder area is usually present. Radiographs may, or may not, show the presence of gall-stones; they may reveal displacement of the pylorus upward and to the right, and distortion of the duodenal cap or of the pyloric end of the stomach, especially if there is a complicating adhesive pericholecystitis. Impairment of the general health is common.

4. *Acute Infectious Choledochitis.*—After an attack of biliary colic, jaundice develops, with enlargement of the liver, tenderness in the mid-epigastrium and to the right of this, with fever and leucocytosis. If a stone is passed, the infection may subside quickly. Colic may or may not occur.

Recurring pyrexia with chills and sweats (intermittent fever of hepatic origin) points to purulent cholangitis. There is persistent jaundice with bilirubinuria. The gall-bladder is rarely palpable because usually small and shrunken from coexistent chronic cholecystitis. Operation is indicated.

5. *Chronic Catarrhal Cholangitis (Calculous or Non-calculous).*—Chronic intermittent jaundice; sometimes, attacks of biliary colic; fever may be absent, or temporarily present; slight leucocytosis in exacerbations; may be confused with (1) carcinoma compressing the ductus choledochus or (2) hypertrophic biliary cirrhosis.

6. *Biliary Obstruction with Distention of Gall-bladder due to Chronic Pancreatitis or to Carcinoma of the Head of the Pancreas.*—Maximal jaundice (after gradual onset and steady increase without recession) with complete intestinal acholia, bilirubinuria, and pruritus ; usually entire absence of pain and fever ; large, easily palpable gall-bladder. Sometimes a tumour is palpable in the epigastrium. Tendency to emaciation and cachexia greater in carcinoma than in pancreatitis. Glycosuria present in 25 per cent of the cases. Operation indicated, and often too long delayed in the hope that only catarrhal jaundice exists.

7. *Hydrocholecystosis or Chronic Remittent Cholecystosis* (*with or without Stones in the Gall-bladder*).—Brief attacks of pain without fever, recurring for months or years in the right hypochondrium, synchronous with recurring distention of the gall-bladder, but without signs of local or general infection (Berg). A Riedel's lobe may be palpable, and, if so, may be mistaken for a mobile kidney, a hydronephrosis, or a neoplasm.

8. *Carcinoma of the Gall-bladder.*—Nodular mass palpable in gall-bladder region, appearing in a patient who has earlier shown signs of cholecystitis or of gall-stones ; jaundice in 75 per cent of the cases ; ascites in 25 per cent ; metastases in the liver may occur early ; cachexia common. Operation, unless performed very early, rarely saves the patient. Death usually occurs within a few months.

REFERENCE.—[1]*Jour. Amer. Med. Assoc.*, 1920, Oct. 23, 1105.

GALL-BLADDER, SURGERY OF. *E. Wyllys Andrews, A.M., M.D., F.A.C.S.*

A large part of the literature of the year on this subject is taken up with the question of **Drainage.** A veritable crusade against its use has been conducted by Richter[1] and Willis[2] in America and by Haberer[3] in Germany, and our views on the subject have been profoundly modified. In one clinic after another the use of drainage is being abandoned entirely or in part, and nearly all surgeons are at least making their drains far smaller. The arguments for omission of drainage after a cholecystectomy, as given by these authors, were described in last year's MEDICAL ANNUAL ; now the best argument of all is becoming evident—that is, many large series of successful cases. Buchbinder[4] has shown how, in dogs, insertion of drainage produces adhesions. The lessened danger of post-operative hernia is quite evident. The tendency of the drain to bring about a leakage of bile cannot be denied. Far less of the undrained cases have leaked bile. Martin[5] suggests that this drainage comes, not from the bile-duct, but from the raw surface of the liver, and is under no pressure, and therefore would not occur if no drainage were used. Bile in small amounts in the peritoneal cavity is relatively non-toxic, and, although it tends to produce adhesions, certainly will not produce as many as a bile-soaked tampon. As to the necessity of allowing the escape of infectious material from the abdomen, if we may put any trust in analogy, it is of no more use than similar procedures after operations on the stomach or bowels, where experience has taught us that it is worse than useless. Never, in other conditions, do we expect to accomplish anything by drainage of a potentially infected peritoneum.

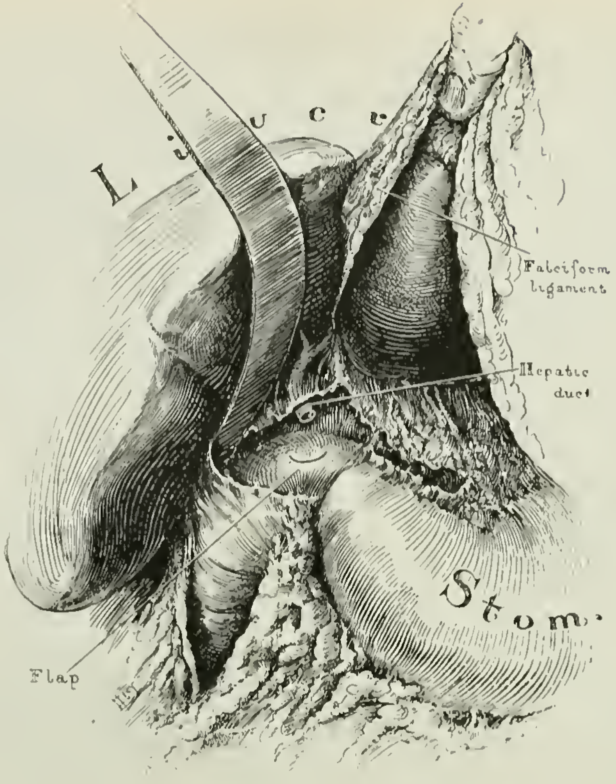
The limitations of this method, however, are distinct. Only in the presence of a chronic or mild form of infection can the drainage be omitted. This, however, makes up a very high percentage of our gall-bladder surgery, as the operation is usually postponed until such conditions have been attained. One is seldom compelled to operate in the midst of an acute attack of cholecystitis, as the patient can nearly always be tided over to a more quiescent period by careful medical management.

More important than theory, however, is the fact that experience in the last three years has shown that drainage can safely be omitted in a large number of cases. Haberer[3] and Ritter[6] have abandoned the use of drains. Bloodgood[7] drains only if the common duct has been opened. Bottomley[8] closes about 65 per cent of his cases. C. H. Mayo[9] has merely left a strand of catgut as a drain and cut it off on the fourth day if the convalescence is normal. McGuire[10] uses merely a small piece of oiled silk. [The reviewer has abandoned the use of packing in most cases, and now inserts a small folded guttapercha strip and removes it in three or four days. He believes this procedure has now been sufficiently tried to warrant its adoption as a standard method in surgery.—E. W. A.]

White[11] reports several cases in which he did **Cholecystgastrostomies** with very good results. This operation is indicated in obliteration or stricture of the common bile-ducts, and carcinoma of the head of the pancreas. It has been advocated by some as a method of providing an alkali cure in ulcer of the stomach. Its greatest use, however, is in biliary cirrhosis; the results in this disease have been exceptionally good. In one of his cases a Murphy button was used and it failed to leave the stomach, and we are warned against employing it. The best technique is to use two rows of fine sutures. The pyloric end of the stomach on the anterior wall is the best site for the anastomosis. The duodenum is not used on account of the greater danger of fistula formation. There seems to be no danger of ascending infection of the gall-tracts, and the digestion is not in the least impaired. Analysis of the gastric contents shows them to be full of bile, but no vomiting or regurgitation has occurred. Forni[12] has made sections of the wall of the gall-bladder 42, 80, and 130 days after this operation in dogs. At first there were very marked reactions, as the food and bacteria entered the gall-bladder. Severe inflammation results, and extensive desquamation and minute ulcerations appear. Later the lymphoid tissue undergoes marked hypertrophy, the round-cell infiltration disappears, and at the end of about four months the gall-bladder mucosa appears to have accommodated itself to its new environment and returns nearly to normal, although the lymph-follicles remain much enlarged.

Gosset, Loewy, and Mestrezat[13] have published some interesting researches on the *pathology of hydrops of the gall-bladder*. The first stage, after the cystic duct is blocked, is that the normal function of the gall-bladder is for a time carried out and mucus in large quantities is added to the bile. Later, as the tension becomes greater, this activity is less pronounced, and a beginning of the absorption of the pigments and other biliary contents takes place. Finally, not only is all the colouring matter absorbed, but also all the cholesterin and other lipoids, as well as the bile salts and acids. Usually at this stage the mucus present is also small in amount. The final stage is the formation of a clear serous transudate. This is not a secretion. Sections show that the epithelial elements in the wall of the gall-bladder have been entirely lost. The lining is only fibrous tissue the same as the rest of the wall. Chemical analysis of the contents at this stage show that the fluid is simply a transudate. None of its original contents are present at all. It consists simply of a fluid very similar in character to the serum of the blood, which is probably its source, without any change by passing through a mucous membrane.

Robitschek and Turolt[14] report the first actual measurements of the *pressure in the bile-ducts* in man. They were made on four cases in which tubes had been tightly sewn into the common bile-duct for the purpose of drainage. The pressure varies with respiration and other acts influencing the tension of the general abdominal musculature. For instance, the respiratory variation was about 15 mm., and a rise of 50 mm. was noted on violent coughing. With



Figs. 34.—Adhesions divided and cut end of hepatic duct exposed.

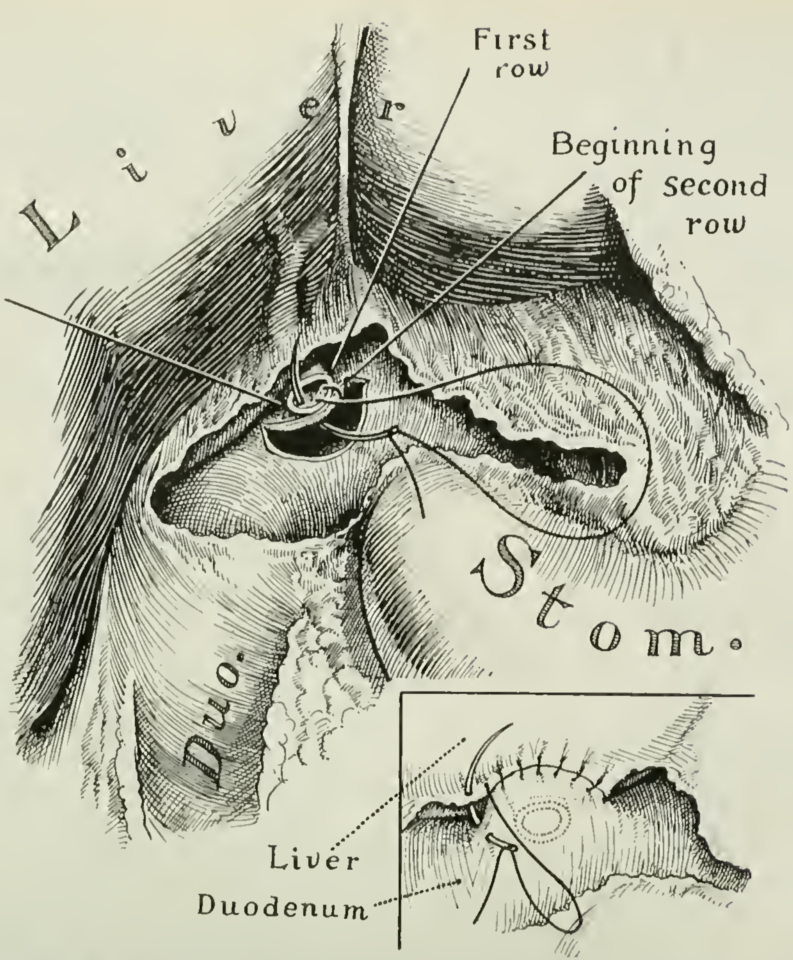
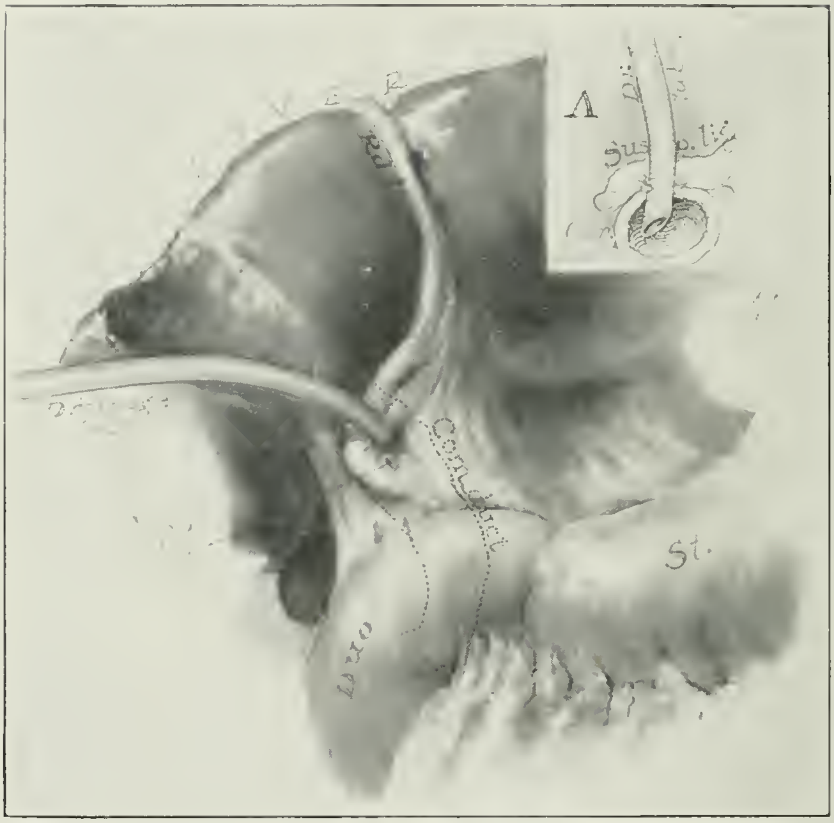


Fig. 35.—All layers of the duodenal flap sutured to the entire thickness of the hepatic duct two-thirds of the way around posteriorly to secure a mucomucous union posteriorly and laterally. The inset shows the free anterior margin of the liver above, leaving a large interval between the duodenal mucosa and duct so as to allow for contraction. (*Figs.* 34 *and* 35 *redrawn from the 'Annals of Surgery'.*)

PLATE XI.

SURGERY OF THE GALL-BLADDER.



Skillern's method of peritonealization by suspensory ligament of liver after choledochostomy (also for cholecystostomy). A, effectual sealing is obtained by this method.

By kind permission of the "Journal of the American Medical Association".

the patient at rest and breathing normally, the pressure in two of the cases was 220, in one 270, and in the fourth 210. These measurements are expressed in the height of the column of bile in a manometer tube. The rate of bile secretion was in no way related to the pressure. The effect of drugs on this pressure was also ascertained. This was slight but definite. Physostigmine and pilocarpine brought about slight rises in pressure, and papaverine slight lowering.

The method here illustrated (*Figs.* 34, 35) of *uniting the hepatic duct with the duodenum* is described by Balfour,[15] and has given the most satisfactory results in his hands. Accidental injury to the common duct is a complication of gall-bladder work that will always be with us, and a great many methods of repair have been devised. This method, that of W. Mayo, has many advantages. The stump is often too short to do any of the other procedures, most of which require an oblique implantation into the duodenum. One usually finds the cut end of the duct retracted flush with the edge of the liver. Another drawback to the other method which is avoided by this one is the danger of subsequent stricture. Here, as the illustrations show, the opening in the bowel is very much larger than the lumen of the bile-duct. It is so large, in fact, that there is usually a considerable drainage of bile for the first few days. After the upper flap of the bowel is sutured to the liver as depicted, the next step is to turn up the omentum and to suture it firmly and widely over the field of operation so as to bury the point of anastomosis deeply.

Simon[16] has done five cases by a rather daring procedure. He actually bridged the gap between the bile-duct and the bowel with a small rubber tube in cases where the duct itself could not be made to reach. The results have been so good that he has gone so far as to advise the adoption of this method even where the other is possible.

Skillern[17] has suggested that in these plastic operations on the bile-ducts, as well as other operations in which they are opened, the suspensory ligament of the liver may be freed from its attachment to the anterior abdominal wall and, together with the round ligament, be used to reinforce our line of suture or to surround the drain (*Plate XI*). In many cases the omentum would probably serve this purpose, but it is often shrunken or adherent in the lower abdomen and will not reach. Finally, it is a question if this method is not better anyhow, as we are sacrificing a perfectly useless organ, while the fastening of the omentum up over the colon and stomach in an unnatural position may prove harmful, and the rest of the abdomen is deprived of its protection.

REFERENCES.—[1]*Illinois Med. Jour.* 1921, May, 256; [2]*Jour. Amer. Med. Assoc.* 1921, March 12, 712; [3]*Centralb. f. Chir.* 1920, Dec. 18, 1530: [4]*Jour. Amer. Med. Assoc.* 1921, July 23, 256; [5]*Boston Med. and Surg. Jour.* 1921, March 31, 325; [6]*Centralb. f. Chir.* 1921, March 5, 305; [7]*Jour. Amer. Med. Assoc.* 1921, July 23: [8]*Boston Med. and Surg. Jour.* 1920, Aug. 19, 232; [9]*Minnesota Med.* 1921, Jan.; [10]*Surg. Gynecol. and Obst.* 1920, Dec., 614; [11]*Ibid.* Nov., 493; [12]*Arch. ital. di Chir.* 1921, Feb. 10, 275; [13]*Presse méd.* 1921, June 8, 453; [14]*Wien. klin. Woch.* 1921, June 2, 263; [15]*Ann. of Surg.* 1921, March, 343; [16]*Beitr. z. klin. Chir.* 1920, Feb.; [17]*Jour. Amer. Med. Assoc.* 1921, Feb. 12, 445.

GANGOSA.

Sir Leonard Rogers, M.D., F.R.C.P., F.R.S.

N. Crichlow[1] describes 2 cases of this disease, 1 of which healed under six bi-weekly injections intravenously of $\frac{1}{2}$ c.c. of **Colloidal Antimony**, and the other cleared up with three weekly doses of 15 cgrm. each of **Galyl**, washing with a weak **Permanganate** solution being also used in both cases.

REFERENCE.—[1]*Jour. Trop. Med. and Hygiene*, 1921, 74.

GASTRIC ANALYSIS.

O. C. Gruner, M.D.

The assiduous prosecution of the study of fractional gastric analysis during the past year has helped to an altogether better understanding of the workings of the stomach, not only in disease, but more particularly in health. Whatever be the merits of the old form of gastric analysis—that of withdrawing one sample and making an elaborate analysis of it—or whatever be the demerits of the new form, we owe to both an amount of knowledge which has long been needed.

Willcox,[1] Mackenzie Wallis,[2] and others have shown the value of the former method, because by its proper use the presence of even an early carcinoma in the stomach can be satisfactorily determined. Gorham[3] has objected to the fractional analysis, as usually understood, on the ground that the samples withdrawn in it are not representative of the whole contents at any given moment. He therefore removes the contents of the fasting stomach ; gives a meal of shredded wheat biscuit and water ; passes the tube again in 45 minutes, and then withdraws the whole contents in 10 c.c. quantities until the stomach is empty. Each of these 10 c.c. samples is analyzed separately, and the results are charted. He found that there were decided variations, the acidity usually increasing over and beyond the value for that particular 'fraction' as understood by the customary method. Gorham considers that some of the discrepancies in the ordinary readings are explained by this finding, and that his results prove that a given sample is not representative of the whole contents at that time. However, this objection seems much more apparent than real.

The considerable number of those experimenters who find the analysis so widely used by Rehfuss and Hawk, from 1914 onwards, to be of actual advantage, speaks for itself.

Chiasserini,[4] studying the matter in Rome, is a recent continental supporter of the customary method.

By far the most important outcome of all the studies made in this direction consists in the improved conceptions about the functional powers of the stomach. The assessment of functional activity of the organs of the body has been specially referred to in past issues of the MEDICAL ANNUAL. The clinical laboratory is justified more as an instrument for making these assessments than as a place in which clinical diagnosis (the diagnosis of particular diseases) is to be made. This department of the hospital is therefore the rallying-point for assessing the actions of the stomach, as well as of all other organs, in different persons who are presumably healthy. The actions in various diseased states are then better appreciated.

Rehfuss and Hawk[5] have expended much thought upon the question of fixing what is to be considered as normal or physiological, in regard to the fractional meal. They divide the work of the stomach into (1) secretory, (2) motor. In regard to each of these two aspects, the work done varies very greatly in different individuals. Other writers have noticed the same fact. But so far from depriving the fractional meal of value, it enhances it. It is so necessary to grasp the truth that individuals are separate personalities even in their organs, to prevent mistaken interpretations of laboratory findings. After this is thoroughly understood, the place comes for Ryffel's[6] remark : "The fractional test-meal gives results that . . . . serve rather for arranging the cases into various groups than for individual diagnoses". The presence or absence of (3) pathological products (mucus, pus, blood, organisms) completes the list of data required for the preparation of the accompanying charts.

TEST-MEAL CHARTS.

Five types of test-meal chart may be specified, according to the classification given by Best.[7]

The following figures (*Figs.* 36–40) show the five types of curve spoken of. In addition, the various components of the analysis are shown arranged according to their significance (motor, secretory, pathological), these details being supplied from other cases.

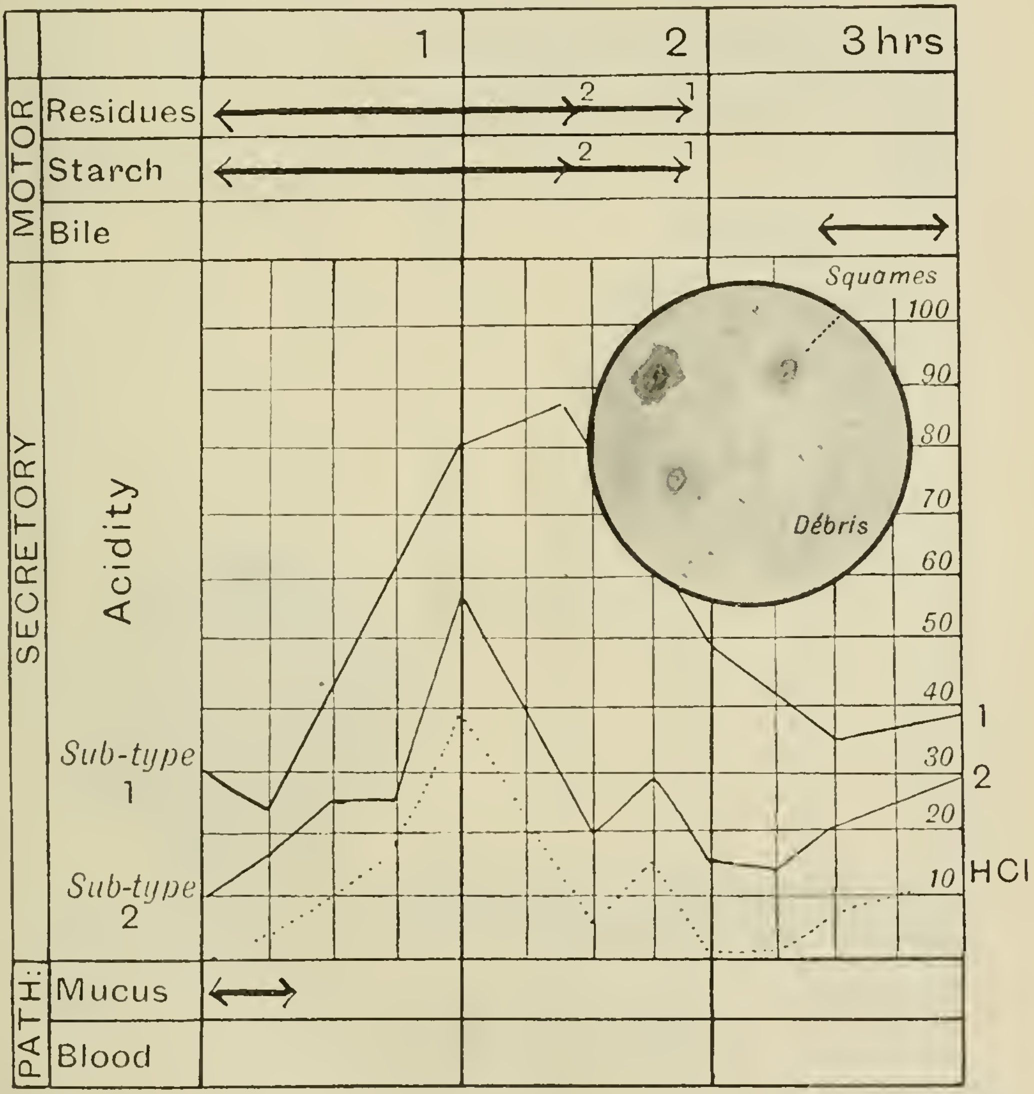


Chart I.—NORMAL CONDITION.

Fig. 36 shows the complete form of chart. The small squares and numbers are omitted in the subsequent charts for the sake of clearness, and to fix attention on the three periods of the chart rather than on subdivisions of time.

The 'normal' shows two kinds of curve, sub-type 1 where the peak is reached in 1½ hour, sub-type 2 in 1 hour. The hydrochloric acid curve (*dotted line*) is roughly parallel. Inset is the appearance of material (chosen, e.g., from the seventh fraction) under the microscope. Two variations in duration of the presence of residues and starch are shown, numbered to correspond with the acid curves.

METHOD OF ANALYSIS.

General Points.—The actual test-meal consists of two tablespoonfuls of breakfast oatmeal with one quart of water. This is boiled down slowly to one pint, strained through muslin, salted to taste, and given warm first thing in the morning. The last meal, according to Best, consists of two or three prunes or raisins. A sample of the gastric contents is taken before giving the meal, the Rehfuss tube interposing no difficulty in swallowing this.

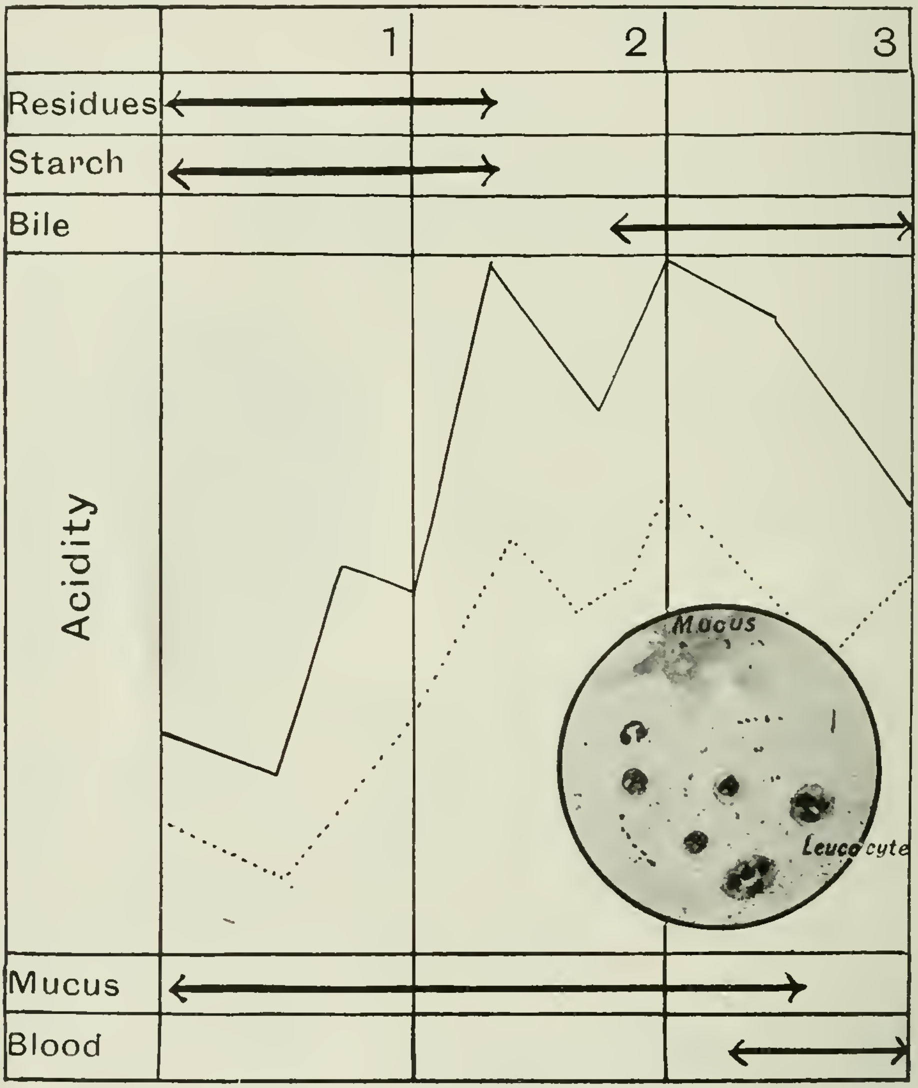


Chart II.—DUODENAL ULCER.

Fig. 37. Typical form of curve in duodenal ulcer. The microscopic field shows leucocytes, streptococci, and other organisms. The stomach empties rapidly. Secretion becomes greater when the food has entered the duodenum.

Special Points.—The components recorded on the chart inform us as to: (1) The secretory power: total acid, free HCl, presence of starch. (Some workers record the ferments also.) (2) The motor power: the time at which the stomach becomes empty, the presence of bile, change of shape of the curve. (3) Pathological products: presence of blood, pus, tumour-cells, organisms.

The method adopted for determining free HCl (by Töpfer's reagent) has been criticized by many, notably by Cole and Adie.[8] Willcox,[1] Wallis,[2] and others prefer to estimate the mineral chlorides. Ryffel[6] has referred to the objections inherent in that estimation, and takes an altogether more reasonable view about the use of Töpfer's reagent. It does not change with the organic acids produced by the Oppler-Boas bacillus nor with the acid formed by streptococci. He also shows that the Cole and Adie method of titration is not unimpeachable on purely chemical grounds. Above all, clinical experience supports the Töpfer method.

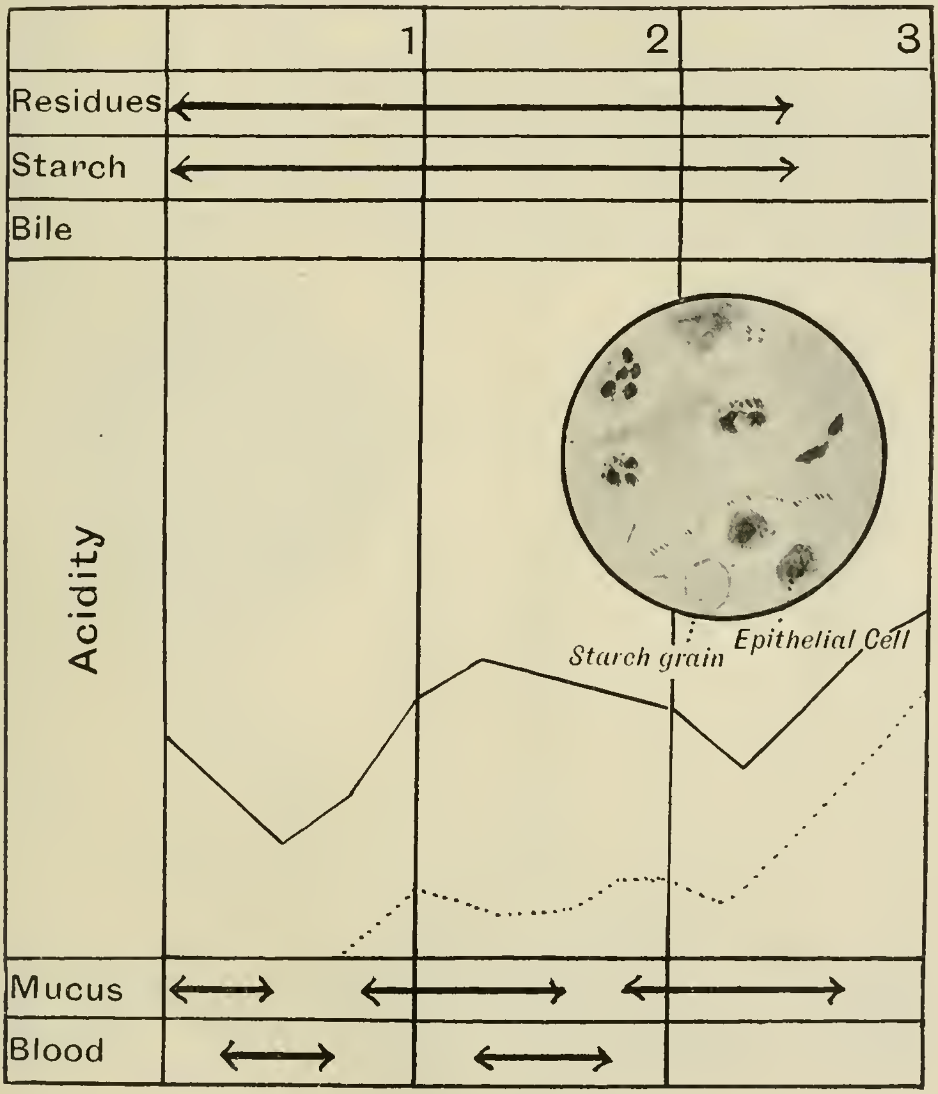


Chart III.—REFLEX GASTRITIS.

Fig. 38 shows a rather subnormal acidity (the line for 50 forms a convenient standard); digestion is slow, and emptying of the stomach is delayed. Leucocytes and epithelial cells and streptodiplococci are found microscopically.

Testing for Ferments.—Willcox[1] continues to use the method he spoke of in 1908 for determining the rennin activity. This gives a fairly accurate representation of the pepsin present. Bosisio[9] discusses a method of determining the pepsin and rennin which is more of academic interest. McClure, Wetmore, and Reynolds[22] present new methods for estimating enzymes. They claim that the existing methods do not give proper consideration to five factors: (1) Quantitative accuracy and practicability of procedures for estimating the amount of enzyme action; (2) Uniformity of enzymatic activity; (3) Proportionality of enzyme action; (4) Stability of an enzyme; (5) Physical state of the medium in which the enzyme is to act. Their thesis, however, does not cover (1) and (5) in regard to fractional analysis.

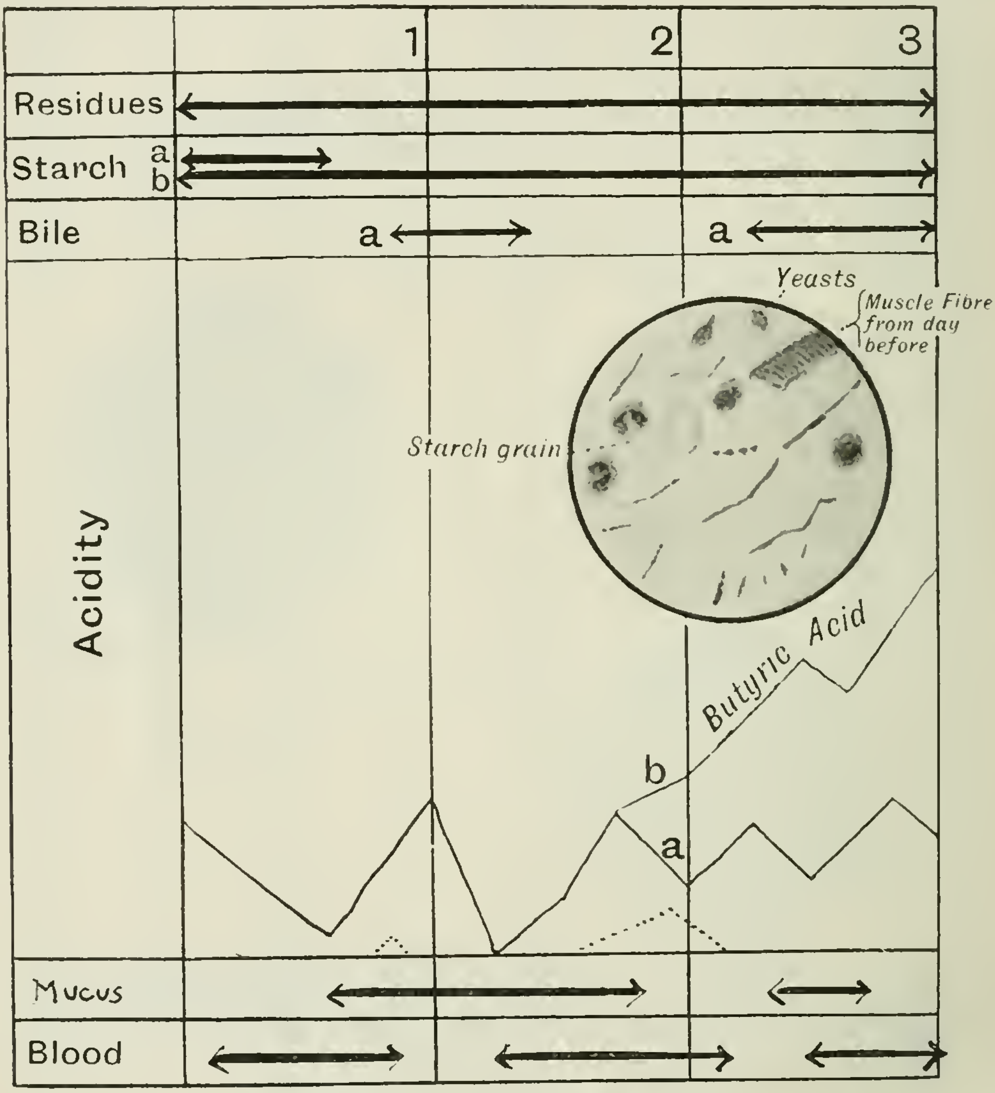


Chart IV.—CARCINOMA.

Fig. 39 shows a low and very variable acidity. The curve may rise in the third period, perhaps owing to the presence of butyric acid rather than of HCl. Undigested muscle fibre is shown in the inset, proving retention from a previous meal. HCl is found occasionally.

DEDUCTIONS TO BE MADE FROM THESE OBSERVATIONS.

I. The Secretory Power of the Stomach.—This manifests as two stages of a cycle: (*a*) The digestive period: (*b*) The interdigestive period. Crohn and Reiss[11] and Best[7] make the duration of (*a*) from 1 to 1½ hours; Bennett makes it 2 to 2½ hours. [In the reviewer's experience, it is good to divide the chart into three portions. The middle portion is then the guide to whether the secretory power is normal. Starch should have disappeared half-way along the chart—that is, at $1\frac{1}{2}$ hours. The character of the interdigestive period is shown not only in the third period of the chart, but also in the character of the material removed from the fasting stomach.—O. C. G.] Hayem[13] considers that a discovery of fluid in the morning fasting stomach is always a sign of abnormal conditions.

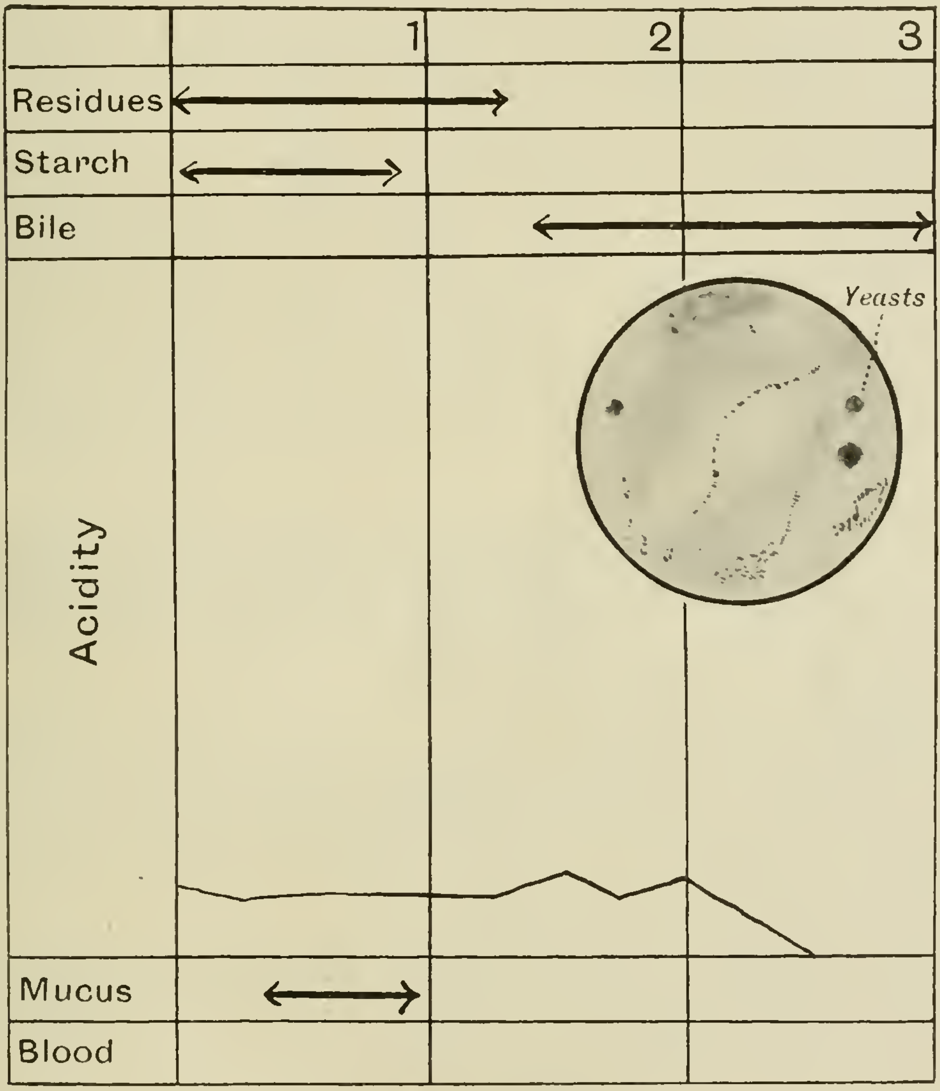


Chart V.—ACHYLIA.

In the fifth Chart (*Fig.* 40) the total acid curve is low, and there is no HCl.

Although names of diseases are attached to the figures, it is insisted in the review that the charts really belong to types of gastric function, and not to certain diseases. However, certain types are more likely in the diseases named, and therefore suggest inquiry in those directions.

Good secretory work is shown by the acid curves rising within half an hour from the onset, with a pronounced height of curve (to 60). The entry of saliva causes the curve to fall briefly at first. The curve showing the free acid should be about 20 points lower. The character of the curve in the third part of the chart supplies information in regard to the motor power.

Abnormal secretory work.—There are two main types of curve indicating that secretory work is abnormal.

1. Achlorhydria: So much has been said about absence of HCl being a sign of carcinoma that the modern views are unexpected. Absence of HCl is met with in a number of conditions, and is not a constant feature of carcinoma. Free HCl may be absent for the first hour from functional defect. A certain number of healthy persons show this feature. Dauwe[11] points out that this phenomenon may be inherited. The laws which govern the inheritance of other characters govern the transmission of this feature. 'Achylia gastrica' is not a disease of its own.[7] A very low irregular HCl curve, reaching zero a few times during the first two hours, means chronic gastritis, or the presence of a focal infection with systemic reaction, tuberculosis, lues, or carcinoma.

2. Hyperchlorhydria, hyperacidity: This condition is present when the curve is high in the third part of the chart, showing a 'sustained plateau', or period of 'continued secretion' (Ryle[15]). Crohn and Reiss[11] find this phenomenon present in 10 to 15 per cent of all persons with gastric complaints. It is *the* feature of duodenal ulcer. But it also occurs reflexly from abnormal states in other organs (appendix, gall-bladder, tabes). When the chart shows this character, the microscopic examination should be carefully made. Dauwe finds that hyperchlorhydria also is an inherited property in some people. It goes with rapid emptying of the stomach. The question arises whether ulcer is an incident in the life of a 'hypersecretor' person, and not the cause of the high acid curve.

Non-parallelism of the two curves (total acidity and free HCl) is an important sign of abnormality, directing the search into further directions.

The types of acid curve, and the types of disease which belong to them, are shown in *Figs.* 36 to 40. The relation between the signs of secretory disorder and the various diseases is given in the Table opposite.

II. The Motor Power of the Stomach.

A. Methods of Assessment.

1. Meunier[16] adopts a simple method. The patient swallows a capsule of ether enclosed in a small sac of guttapercha, the neck of which is closed by means of a ligature capable of being digested by the gastric juice. After digestion of the ligature, the capsule is liberated and almost immediately dissolved by the gastric juice. A characteristic ether eructation takes place, the time of the occurrence being noted.

2. The movements of the total acid curve give information about the motility of the pylorus. If the curve falls to a noteworthy extent in the third period, this is the moment of relaxation of the sphincter. It is at this point that the alkaline duodenal fluid is flowing into the stomach through the relaxed pylorus.

3. Wallis[2] depends on the estimation of the mineral chlorides (this cannot be done properly on the fractional meal: the ordinary single-gastric extract is requisite so as to obtain sufficient quantity of material). Willcox[1] also trusts to this form of analysis. Ryffel[6] explains where it is defective.

4. Visible disappearance of food-residues from the fractions.

5. Appearance of bile. If bile appears within the three-hour period, it means that there is no pyloric stenosis. The time of its appearance shows the moment when the pylorus relaxes. If the acid curve falls at the same moment, it is fairly conclusive that the sphincter is relaxing. Every fall of acidity suggests regurgitation from the duodenum into the stomach.[7] A trypsin estimation would afford further corroboration. In some cases there seems to be a sort of 'pyloric flutter'. Jarno[17] supports the view that the

TABLE TO ASSIST IN INTERPRETING THE CHARTS OBTAINED BY GASTRIC ANALYSIS. (*G.*)

Signs	Type of Disease					
	Ulcer				No Ulcer	
	Non-malignant			Malignant	Reflex gastric disorder (appendix, gall-bladder, etc.).	Functional; not reflex from gross lesion
	Non-pyloric	Pyloric	Duodenal			
Secretory :—						
Starch digestion quick	30 per cent	Varies	40 per cent	40 per cent	22 per cent	55 per cent
Shape of acid curve	Sharp	Flat	Flat	Irregular	Sharp	Irregular
High total acid curve	30 per cent	90 per cent	33	40 (!)	20 per cent	Not present
HCl curve	Never absent	High	High in 66 per cent	Absent in 75 per cent	High in 84 per cent	High in 86 per cent
Parallelism of curves	70 per cent	90 per cent	75 per cent	12 per cent	85 per cent	11 per cent
Motor :—						
Hurry	Absent	Absent	8 per cent	20 per cent	6 per cent	Absent
Bile reflux	30 per cent	Absent	33 per cent	60 per cent	14 per cent	70 per cent
Pathological Exudate :—						
Mucus	80 per cent	90 per cent	60 per cent	80 per cent	52 per cent	95 per cent
Blood	10 per cent	10 per cent	20 per cent	70 per cent	0	0
Pus	80 per cent	90 per cent	45 per cent	20 per cent	60 per cent	75 per cent
Organisms	Bacilli	Streptococci	Various cocci	Leptothrix	Streptococci 30 per cent	Various cocci

appearance of bile-pigment in the gastric juice is the best indicator of the presence of duodenal fluid.

Boldyreff believes duodenal regurgitation to be a method by which hyperacidity is naturally remedied. Moppert[18] has gone into the matter of duodenal regurgitation carefully, though rather from the point of view of whether a duodenal tube is really in the duodenum or not. One may imagine it is in the duodenum, when the sample withdrawn is really only taken from the stomach.

B. Interpretations.—McClure, Reynolds, and Schwartz,[10] investigating the behaviour of the pyloric sphincter in normal man, have found that the movements of this muscle are not primarily dependent on the degree of acidity of the gastric contents. Under normal conditions, the sphincter opens regularly at the approach of each antral peristaltic wave, allows chyme to pass through into the duodenum during an appreciable length of time, and closes when the antral peristaltic wave has spent itself. Neutralization of the contents of the first portion of the duodenum did not prevent the loosing of the pyloric sphincter. Wheelon and Thomas[19] have made direct graphic and röntgenographic observations, and have also found that the phases of activity in the sphincter are such as supplement those of the antrum. Hence the motility of these two parts may be considered as constituting a cycle of the pars pylorica. The sphincter is open during the greater part of the antral contraction, and actively closed while the antrum is relaxing.

Variations in health.—In some people the motor function is rapid, in others slow. Reyfuss and Hawk[5] found that it depends partly on the kind of food introduced. Cocoa slows the function. The time occupied in digestion of various foods depends not so much on the composition of the food as on the motor function peculiar to that individual. On this view, subacidity assumes more importance than hyperacidity. Food should all have left the stomach in two hours.

Moppert[18] divides cases into four groups: the hypertonic, the orthotonic, the hypotonic, and the atonic. This has a bearing on duodenal analysis, because when the pylorus is hypertonic, the tube is hurried into the duodenum; in the atonic cases the tube runs a long way in the stomach, making the observer imagine that he has it in the duodenum when it is actually still in the stomach.

Variations in disease.—Pyloric spasm. This occurs in four conditions: (1) Ulcer causing stenosis; (2) Atony of the stomach without ulcer (= relative spasm); (3) Appendicitis; (4) Gall-bladder disease. The effect of pyloric spasm on the secretory work is to excite the formation of more acid.

III. PATHOLOGICAL EXUDATION.—The pathological exudations are: blood, pus-cells, tumour-cells, micro-organisms, mucus.

A. Methods of Examination.

Blood: Boas[20] recommends the use of the Gregersen test. This is a modified benzidin test: 0·02 grm. of benzidin is dissolved in 5 c.c. of 50 per cent acetic acid; 0·1 grm. of barium peroxide is added as catalyzer. The reagents can be applied in tabloid form, and the test applied on a porcelain dish or visiting card. The reaction is invariably negative in normal persons on a milk-vegetable diet. Rutz[21] insists that the test for occult blood should be applied to the unfiltered gastric contents, using the sediment after standing or centrifuging. Text-books, he says, invariably give instructions for the filtrate to be employed. In this way occult blood is certainly often missed.

B. Interpretation.

Blood: This means active ulceration, whether simple or malignant. If it comes from a mere abrasion in collecting the contents, the blood only appears in one or two fractions, not in the stool. If blood is present throughout the period, the ulcer is at the cardiac end. If blood does not appear till the second hour, it means either duodenal or pyloric ulcer. Traces only, mean carcinoma.

Pus cells : These indicate an abnormality, but not necessarily the existence of ulcer. They occur in reflex gastric congestion.

Organisms : The specificity of the Oppler-Boas bacillus remains true. Long chains of streptodiplococci may occur in gastric-ulcer cases.

IV. The Chart of Gastric Analysis taken as a Whole.—The great questions to answer from the chart are : (1) Is there a gross lesion at all ? (2) If so, what is the lesion ? Is it congestion simply, or is it actual ulceration ? If it is ulcer, where is it ? Is it cardiac, or pyloric, or duodenal ? Is the ulcer innocent or malignant ? The answers to these questions are provided by a careful consideration of the several components of the chart. These are tabulated accordingly, as shown on page 181. The table must be understood as being to a certain extent arbitrary. Under each column appear statements which are only roughly true. The statements vary in value, and these variations are properly expressed in the form of percentage frequencies. The figures given are derived from personal experiences ; they would need correction from statistics obtained from as many cases as possible.

V. The Relation between Certain Diseases of the Stomach and Duodenum and the Form of the Chart.—This is revealed sufficiently in the table. The only additions to be made are : in the case of carcinoma, the significance of mineral-chloride estimations ;[2] in the case of non-pyloric ulcer, if there is no excess of HCl in the third period it proves that the pylorus is not in a state of spasm, since it is evidently allowing duodenal contents to flow back.[15]

References.—[1]*Lancet*, 1921, i, 594 ; [2]*Ibid* ; [3]*Arch. of Internal Med.* 1921, April, 434 ; [4]*Policlinico* (Sez. Prat.), 1921, May 9, 647 ; [5]*Jour. Amer. Med. Assoc.* 1921, Feb. 5, 371, and Feb. 26, 564 ; [6]*Lancet*, 1921, i, 586 ; [7]*Amer. Jour. Med. Sci.* 1920, Dec., 889 ; [8]*Lancet*, 1921, Feb. 26, 423 ; [9]*Policlinico* (Sez. Prat.), 1921, Jan. 3, 3 ; [10]*Arch. of Internal Med.* 1921, June, 706 ; [11]*Amer. Jour. Med. Sci.* 1921. Jan., 43 ; [12]*Guy's Hosp. Rep.* 1921. Jan., 42, 52 ; [13]*Bull. Soc. méd. Hôp. de Paris*, 1920, Dec. 10, xliv, No. 38 ; [14]*Arch. méd. Belges*, 1920, July, 578 ; [15]*Guy's Hosp. Rep.* 1921, Jan., 42, 52 ; [16]*Med Press*, 1921, i, 194 ; [17]*Wien. klin. Woch.* 1920, Oct. 7, 906 ; [18]*Presse méd.* 1921, May 25. 415 ; [19]*Jour. of Lab. and Clin. Med.* 1920, Dec., 124 ; [20]*Arch. f. Verdauungshrank.* 1920, xxvii, 1 ; [21]*N.Y. Med. Jour.* 1920, Oct. 23, 619 ; [22]*Arch. of Internal Med.* 1920, Oct., 410.

GASTRIC AND DUODENAL ULCER. (*See also* Stomach, Surgery of.)

Robert Hutchison, M.D., F.R.C.P.

5 The discussion as to the relative merits of medical and surgical treatment in gastric and duodenal ulcers, which was referred to in the last number of the Annual, still goes on. What is wanted are accurate statistics as to the end-results of treatment in a sufficient number of cases and after a sufficient interval of time. Eggleston[1] has made a contribution to this desideratum by reviewing 500 cases of peptic ulcer from the records of the Battle Creek Sanitarium. Of these, 415 cases were classed as duodenal, and 85 as gastric. The cases were carefully selected, and he wisely excludes all those occurring prior to the year 1912, as before that time *x*-ray confirmation of the diagnosis was not forthcoming. The cases extend over a period of six years, and in each more than one year had elapsed since treatment ceased. He states that the results have been rather unexpected and in some respects disappointing.

In 156 cases which had been treated medically and in which a period of at least three years had elapsed since the disappearance of their symptoms, 113, or 72 per cent, reported no return of symptoms, and 43, or 28 per cent, reported recurrences. In the 113 cases showing no recurrence, 80 per cent were ideal cases for medical treatment in that the patients were well nourished. had no pyloric stenosis, and no tendency toward perforation. The other 20 per cent showed delay in motility due to stenosis of such a degree as to prolong the emptying time of the stomach from six to eighteen hours, as determined by the barium meal. Where the stenosis is of inflammatory origin and not due to scar tissue, he does not believe it is necessarily an indication that proper medical treatment may not be successful.

The average time of institutional treatment of those cases in which no relapse occurred after a period of three years was five weeks. Each patient at the time of dismissal was told that in all probability, although he was entirely relieved of his distress, his ulcer was not entirely healed, and that it was most essential that he should follow out specific suggestions relative to diet and mental and physical activity, and that he should avoid cathartics and other gastric irritants. The patients were followed up from time to time by correspondence, and were urged to report any recurrence of their former symptoms.

The average length of time under treatment of patients showing a recurrence of their former symptoms was three weeks.

He considers this very significant, as showing the importance of thorough and prolonged treatment in affecting the result. He is of opinion that recurrence of symptoms is due to relapse of an incompletely healed ulcer rather than to the development of fresh ulceration.

In the great majority of cases the treatment used was a modification of Sippy's method (*see* ANNUAL, 1921). The *surgical* statistics given by Eggleston are of little value, as he does not discriminate between the gastric and duodenal cases, and no information is given as to the nature of the operation performed. This, of course, is a point of great importance, for many of the failures after operation are undoubtedly due to selection of the wrong type of operation and to errors in surgical technique. As it is, the author concludes that all cases of duodenal ulcer in which there is marked pyloric stenosis that fails to yield promptly to medical treatment, and those in which there have been repeated hæmorrhages or penetrating ulcers, should be treated surgically. Of the gastric ulcers, since in certain cases they appear to undergo malignant degeneration, all those tending to chronicity and of considerable extent, penetrating or otherwise, and those situated at some distance from the pylorus, would probably be best treated by surgical procedure.

The mortality statistics are interesting. "Tracing all cases as closely as possible, the mortality percentage was only 2·2, which included cases referred for operation. This is a rather significant finding, and would lead us to conclude that the life expectancy of the person suffering from peptic ulcer is exceptionally good. If, as reported by Wilensky, less than 2 per cent of all gastric ulcers develop malignancy, our advice relative to treatment in uncomplicated cases should be decidedly influenced by the fact that the patient is not in great danger of succumbing to his trouble. In following up some of our cases in which hæmorrhage of a grave character, which seemed to threaten the patient's life, had occurred as long as fifteen years before the date of review, we found in a number of instances that there had been no recurrence, and the patient had resumed the normal activities of life. Following the profuse hæmorrhage, the symptoms, which had persisted for some years prior, entirely disappeared and, so far as the patients were able to determine, they were perfectly well."

A propos of this, however, it was pertinently pointed out by one of the speakers in a discussion on the treatment of ulcer, held at Vienna,[2] that it is not the risk to the patient's life which often determines him to have an operation, but the amount of pain and inconvenience which he is suffering. At the same discussion Hochenegg reported 590 gastro-enterostomies for duodenal ulcer with a mortality of 2·2 per cent and a 'complete cure' in 70 per cent. In 11 cases he had to operate later for jejunal ulcer which had sometimes come on very long after the original operation—in one case fifteen years afterwards! He points out that many cases diagnosed as 'jejunal ulcer' are not so at all, but prove at operation to be due to something quite different, such as adhesions, gall-stones, or an ill-performed gastro-enterostomy. He lays great stress on the importance of a correct operative technique if the best results are to be attained.

The subject has also been discussed by the Royal Medico-Chirurgical Society of Glasgow,[3] but little that is helpful seems to have been brought out. The most useful contribution was that of Dr. R. O. Adamson from the point of view of the general practitioner. He quoted a statement of Dr. Hurst to the effect that 'if practitioners and physicians only did their duty, cases of ulcer would never reach the stage in which the surgeon's help was required', and made the dry comment that the 'statement commands our interest and consideration, but also makes it clear that Dr. Hurst has never engaged in general practice'. His experience has been that the medical treatment of gastric ulcer is successful—up to a point; but that in a large group there is recurrence or relapse, with the always possible occurrence of dangerous complications; and though under purely medical treatment cure may result, and does result, it has often to be accomplished by surgical treatment, the results of which are highly satisfactory.

In duodenal ulceration medical treatment also meets with success—up to a point; but, just as in gastric cases, relapse is apt to occur in a great many after intervals of time; and chronicity is established, and the hæmorrhages and perforations are likely enough to occur. If this be so, then as surgery accomplishes some of its most brilliant results in this disease, the treatment, while medical in the early stages, should not be continued too long before it passes to the surgeon—that is, if the treatment has been really strict, and, during it, symptoms continued or returned.

Bastedo[1] summarizes the effects of a gastro-enterostomy by saying that *when there is obstruction* to the exit of food the operation permits stomach emptying and relieves the retention. But in *non-obstruction cases* it does not, at least to any great extent, relieve the ulcer-bearing region from peristaltic activity, from the irritation of food and gastric juice, and from high peristaltic pressures; it does not favour gravity drainage; it does not, as a rule, accelerate the emptying time; and it does not act through the neutralization of high acidity by the bile and pancreatic juice which it permits to enter the stomach. Therefore, except in cases of obstruction, due either to disease or to operative procedure, as in pyloric stenosis or pyloric removal and possibly hour-glass contraction, we are unable to discover a satisfactory reason for a good result from gastro-enterostomy. It would therefore seem a pertinent question to ask: Except in the presence of obstruction, what useful function does gastro-enterostomy perform?

To this question he does not attempt to reply, but concludes that operation, though indispensable in some cases, should only be resorted to after thorough medical treatment has failed. He considers operation imperative and medical treatment futile in the following conditions, namely: (1) Chronic penetration as shown by radiographs; (2) Palpable induration; (3) Adhesions which cause distortion of the stomach, interference with peristalsis, or much pain during the digestive period; (4) Permanent hour-glass; (5) Pyloric stenosis not syphilitic; (6) Repeated copious hæmorrhages; (7) Conditions suggesting that an ulcer is becoming malignant. In duodenal ulcer, as carcinomatous change rarely occurs, this is not of moment; but since in gastric ulcer this change is not infrequent, its possibility must induce an earlier consideration of surgery.

Like most recent writers, Bastedo lays stress on the importance of the patient continuing under medical supervision for an indefinite time after operation. Doerfler,[5] on the other hand, maintains that a chronic gastric ulcer is incurable without operation, and that it is the duty of the practitioner to hand over all such cases to the surgeon.

From all of this it is clear that opinions on the relative advantages of medical and surgical treatment in ulcer cases are still much divided.

The bulk of last year's literature on ulcer deals mostly with radiographic technique and interpretations of its results, and is of no direct interest except to the specialist. On the etiology of peptic ulcer there is no new light forthcoming, but Eggleston in the paper already referred to states that he was unable to find evidence of foci of infection in the cases investigated at Battle Creek in any higher proportion than in other organic diseases. With this the experience of the present writer is in complete agreement. The part played by 'oral sepsis', etc., in the production of ulcers is certainly exaggerated.

REFERENCES.—[1] *Jour. Amer. Med. Assoc.* 1920, Dec. 4, 1542; [2] *Wien. klin. Woch.* 1920, No. 52, 1140; [3] *Glasgow Med. Jour.* 1921, March, 209; [4] *Amer. Jour. Med. Sci.* 1920, Oct., 491; [5] *Münch. med. Woch.* 1921, March 4, 279.

GASTROSCOPY. (*See* ENDOSCOPY, PERORAL.)

GENITAL PROLAPSE.

W. E. Fothergill, M.D.

The end-results of vaginal operations for genital prolapse.—W. E. Fothergill[1] gives the results of 156 operations done during 1914–15–16, according to the technique described and figured in the MEDICAL ANNUAL for 1917, p. 248. The results were collected by Dr. F. H. Lacey by means of letters of inquiry and subsequent examination of many of the patients. Of the 156 patients traced, 150 state, without qualification, that they are cured, while six do not. (1) Has had three children since the operation and the womb has come down again. (2) Says "the womb is not as it should be". On examination she had no prolapsus. She is at the menopause. (3) Has had no chance owing to chronic cough and asthma: this was a case of rectocele only. (4) Was found on examination to have some vaginal prolapse, the uterus being in good position. (5) A case of rectocele only, had an instrumental confinement and was badly torn, with slight recurrence of rectocele later. (6) Says "the womb is painful at times". Examination shows no recurrence of prolapse. Thus two out of the six are found on examination to be anatomically free from prolapse. Adding these two to the 150 who say they are cured, the result is 152 successful operations out of 156, namely, 97$\frac{1}{5}$ per cent. As to the ages of the patients, about one-third of them had passed the menopause.

The combined amputation of the cervix with anterior colporrhaphy was done in 124 cases, the cervix being retained in the remainder; a few of these required no anterior operation, but only colpoperineorrhaphy for rectocele. No case of mere perineal repair is included. An interesting point is that 32 cases were examples of elongated cervix with inversion of the vaginal walls from above downwards. This is the only variety of prolapse which occurred in nulliparous women.

Since their operations, 21 of the women under 40, and 3 of those over 40, have had children; and 2 others were pregnant. Thus 26 of the women of reproductive age have conceived subsequently to operation. Of these 26, no less than 23 had the cervix removed by the combined operation. Thus this operation has failed to prevent pregnancy in nearly a quarter of the women of reproductive age.

Thirty children have been born to the 24 patients; of the 30 labours, 23 were natural and 7 were instrumental; but in no case was labour obstructed. Four patients have had two labours each with no recurrence; 17 patients have had one labour each with no recurrence. One patient had one labour and was badly torn, with recurrence of rectocele not requiring treatment. Another had one labour and says the womb falls slightly when she is tired, but does not require further treatment. Another has had three labours and there is recurrence which should be treated by another operation. Thus prolapse sufficient to cause inconvenience has only returned in one case out of 24.

The writer thinks it must be allowed that **Vaginal Operations** afford, for all varieties of prolapse, treatment that is efficient, safe, and permanent, that does not prevent pregnancy, and that stands the test of parturition in a large proportion of cases. This being so, it follows that the addition to these vaginal operations of any abdominal intervention is unnecessary and therefore undesirable. It involves trouble and loss of time to the operator, and adds to the risk and discomfort to which the patient is exposed. For it cannot be denied that the risk is increased whenever an abdominal section is done in addition to an extensive vaginal operation. To put this in another way, the family medical adviser will not send his cases of prolapse to specialists who cannot cure them without opening their abdomens, when he knows that there are others who cure their cases with monotonous regularity by the vaginal route alone. This is one reason for avoiding abdominal operations in the treatment of prolapse. But there is another, and even more serious one, for many men are still using these measures, *not in addition to, but instead of*, vaginal surgery, with inevitable disappointment. It is not to the credit of the profession that women should go home with their cervices still projecting at the vulvar cleft after having undergone the risk, discomfort, and expense of futile ventrofixations at the hands of those who have never attempted to learn vaginal surgery.

OPERATIVE TREATMENT.—F. H. Lacey[2] followed up the results of operations done at St. Mary's Hospital, Manchester, during 1914–15–16. He wrote to 750 patients and received 521 replies, 455 of which reported complete symptomatic cure (87 per cent). Of those patients who did not say they were cured, he was able to examine 29; 17 of these had some prolapse or other discoverable abnormality; one only had procidentia, and she was 75 years old and had chronic bronchitis. Of the milder cases of recurrence, some had followed labour subsequent to operation, some were apparently due to bronchitis and asthma, and others had not had the cervix removed at the original operation although considerable elongation was present. The relationship of parturition to recurrence was interesting. Taking the patients of reproductive age, 330 successful cases had had 67 children since their operations, 19 improved cases had had 6 children, and 33 failures had had 16 children. For the 67 children forceps were used in 32 per cent of cases; for the 6 children forceps were used in 80 per cent; and for the 16 children forceps were used in 62 per cent; so that both failures and improved cases showed a higher ratio of labours and of instrumental deliveries than did the cases free from recurrence. These operations were done by ten different operators, and the patients were mostly working women who had to return to work in cotton mills and other laborious occupations very soon after their stay in hospital. The operations used were anterior colporrhaphy, amputation of the cervix, perineorrhaphy, and colpoperineorrhaphy. The author considered that abdominal operations for genital prolapse were unnecessary in the vast majority of cases, but might be admissible in certain cases of developmental error or where certain complications existed such as adhesions with retroversion of the uterus.

REFERENCES.—[1] *Brit. Med. Jour.* 1921, June 18; [2] *Ibid.* 893.

GLANDERS.

E. Graham Little, M.D., F.R.C.P.

Glanders is a sufficiently rare affection in the human being to warrant drawing attention to a well-reported case described by Jacob.[1] The patient was a farmer, who attributed the infection to a diseased cow which he had milked. The primary lesion was an ulcer on the right wrist, which reached the size of half a crown, discharged much matter, and took three weeks to heal. This first lesion was succeeded by many others, which all commenced in the same way, as a papule which rapidly enlarged, so that within twenty-four hours a hard mass like a Hunterian chancre and of the size of a shilling would form, limited to the skin. The centre usually became hæmorrhagic, round this a yellow ring marking the indurated margin was noted, and beyond this again was an œdematous area. The whole lesion would enlarge by peripheral extension of the yellow ring, so that within five days such a patch would be 4½ in. in diameter. One lesion in the loin reached 9 in. in five days. Sometimes a fresh lesion would come in the centre of the involuted ring. A week was the average time for the duration of a lesion, which in most cases disappeared without leaving any sign except staining. The lesions were scattered all over the body, but especially on the limbs, back, and flanks (*Plate XII*). Six months after the beginning of his infection the throat became ulcerated, and within three weeks of this complication a large part of the soft palate, the uvula, and hard palate had sloughed away, and he was running temperatures of 100° to 102°. The throat healed somewhat unexpectedly, and he left the hospital with recurring lesions of the kind described on the skin. Five months later he was again admitted into a provincial hospital with a large deep ulceration of the right cheek, which very rapidly extended, to involve the whole side of the face, and the patient died just a year after the date of infection.

Histological examination of sections, carefully studied by Prof. Turnbull, and bacteriological staining of sections by Prof. Bulloch, warrant the author in ascribing the causation to glanders. A very large variety of drugs was tried in treating the case, but with very little benefit in arresting the progress of the disease.

REFERENCE.—[1] *Brit. Jour. Dermatol. and Syph.* 1921, Feb., 39.

GLANDULAR FEVER.

Herbert French, M.D., F.R.C.P.

A full account of this disease is given by Tidy and Morley.[1] It was first described by E. Pfeiffer in 1889, when he gave it the title of 'Drusenfieber', and may be defined as an acute infectious disease, principally of children, characterized by rapid enlargement of the cervical glands, and by a less constant enlargement of the liver, spleen, and the axillary, inguinal, and other glands.

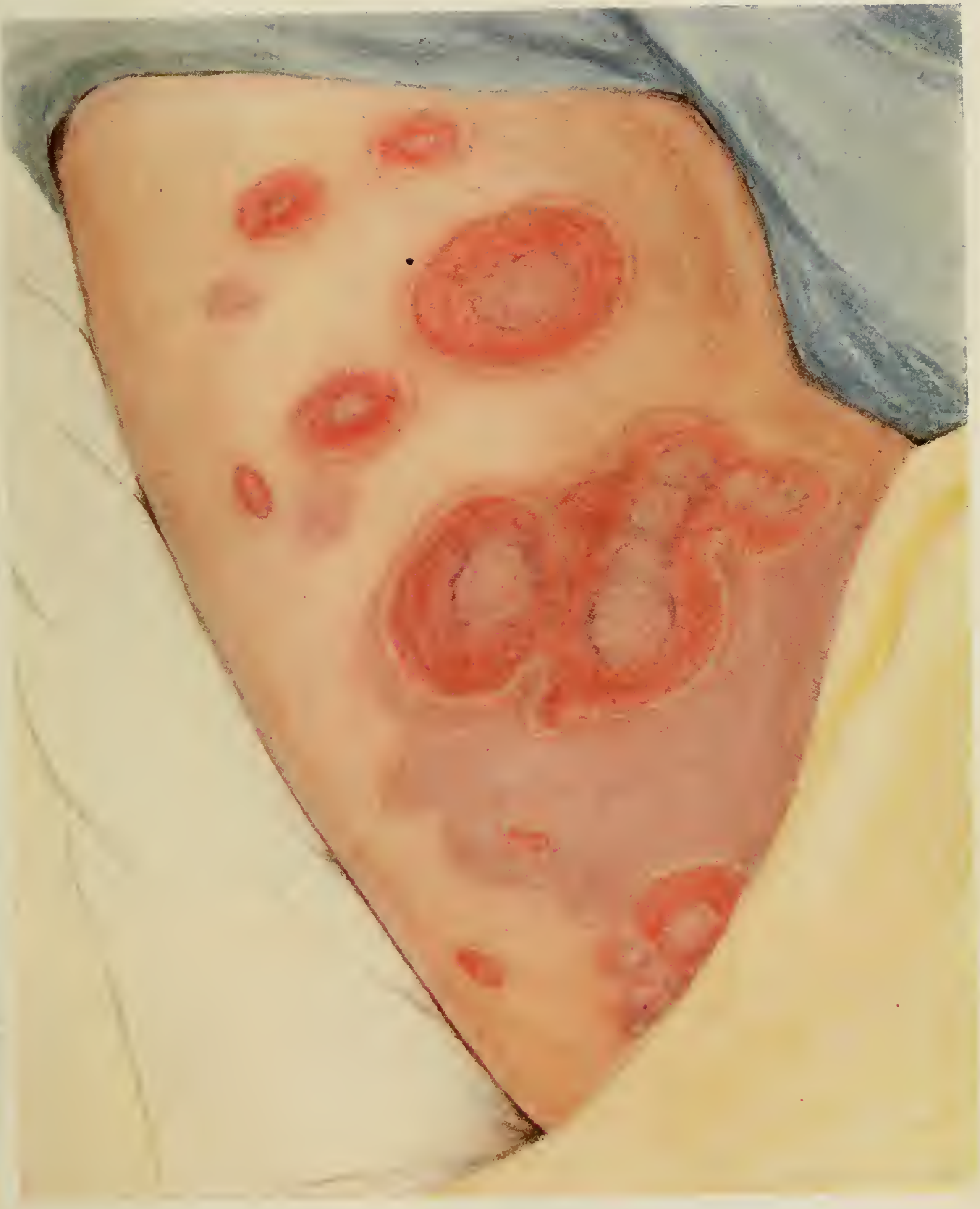
The incubation period is five to ten days, most commonly seven to eight. Out of 464 cases recorded, only 20 were in adults, while 80 per cent were under twelve years of age, the majority being between five and nine. The onset is sudden, with the usual symptoms of an acute pyrexial illness in children. In addition, abdominal pain is sometimes present and may be severe.

Enlargement of the lymphatic glands may be present with the earliest symptoms, or develop rapidly within twelve to forty-eight hours. Those constantly affected are the cervical glands deep to the sternomastoid. Several discrete glands may be felt, often as big as walnuts. Usually unilateral at the onset, the glands on the other side frequently, but not invariably, enlarge later, usually within two to four days of the onset. Other glands in the neck may enlarge subsequently, but to a less extent. The initial enlargement is

PLATE XII.

HUMAN GLANDERS

(F. H. Jacob)



Right side of trunk.

By kind permission of the
'British Journal of Dermatology and Syphilis

below the level of the angle of the jaw, and differs from that due to secondary infections from the tonsils, teeth, and nasopharynx. The parotid and submaxillary glands are not affected. Other glands enlarged are the axillary and inguinal in most cases. The mesenteric are also involved, and may be palpable and the possible cause of the abdominal pain. Possibly, too, the peribronchial glands may be affected, and may be the cause of the paroxysmal cough noted by a few observers.

A slight reddening of the pharynx may occur, but there is no enlargement of the tonsils. There is no rash. Epistaxis and vomiting may occur at the onset. Constipation is common at the onset, but is not the rule, and may be followed by a slimy diarrhœa later. The liver and spleen are enlarged in a considerable number of cases, about 50 per cent.

The temperature usually rises to 101°, 103°, or even 104°, and corresponding to the enlargement of the lymph glands, reaches its maximum on the third or fourth day, after which it falls rapidly, and becomes normal early in the second week.

Bacteriological investigations have failed to reveal any characteristic features. Occasionally the glands may suppurate, when streptococci have always been found to be present.

The blood has not been examined in many cases. A leucocytosis of 14,900 has been recorded in one case on the sixth day, and a case under the author's observation gave a count of 15,000 on the first day. In this case the differential count showed that the lymphocytes formed about 72 per cent of the total white cells. Large lymphocytes predominated, and the condition persisted for about three months.

Complications are rare, but nephritis has to be taken into consideration. In a series of 250, 17 (6 per cent) showed this complication. Œdema does not occur. The evidence at present is insufficient to show whether it becomes chronic or not, although some authors state that this never occurs.

The prognosis is favourable, only 4 fatal cases being recorded, but convalescence is slow, and the glands, though no longer visible, often remain palpable for weeks and even months, while recurrences of the swelling occur and bring back the pyrexia. Anæmia frequently develops during convalescence, and may persist for a considerable time. No second attacks have been recorded.

Diagnosis has to be made from mumps, acute cervical adenitis secondary to infective foci, acute leukæmia, acute lymphadenoma, syphilis, tuberculosis, and possibly influenza. Mumps may be simulated by the fact that the enlarged glands may be in close proximity to the salivary glands and the pre-auricular gland may possibly be enlarged ; but careful examination will always show the true state of affairs. The absence of severe symptoms, of oral sepsis, purpura, and hæmorrhages, and the slight degree of anæmia, which is unaccompanied by nucleated red cells or abnormal leucocytes, serve to distinguish it from leukæmia. (*See also* LEUKÆMIA). The distinction from adenitis secondary to septic infection may be difficult, but the absence of septic foci in fauces, ear, scalp, or elsewhere, together with the rapidity in diminution in the size of the glands, and the good general condition with a palpable spleen and the high percentage of lymphocytes, should render the diagnosis fairly easy.

The diagnosis from acute tuberculous adenitis might have to await the progress of the case.

TREATMENT.—This is entirely symptomatic. A period of fourteen days may be suggested both for isolation and quarantine.

REFERENCE.—[1]*Brit. Med. Jour.* 1921, March 26.

GLAUCOMA.

Lt.-Col. A. E. J. Lister, I.M.S.

Homer Smith[1] thinks that glaucoma is not a disease, but due to a systemic disorder. The causes of glaucoma which are usually given are predisposing or contributory only. Alterations of the composition of the fluids of the eye, due to chemical, toxic, or biological changes, are the exciting cause of glaucoma.

M. Goldenburg[2] concludes : (1) That non-congestive and congestive glaucoma are one and the same disease, the difference being only one of degree ; (2) The cupping is not in direct ratio to the pressure, but largely dependent upon the thickness of the lamina cribrosa and the nature of its component elements ; (3) The presence or absence of congestive symptoms is entirely dependent upon the congenital or pathologic anatomic state, and the degree of intensity of the precipitating factors ; (4) In glaucoma simplex the absence of congestive symptoms is entirely due to a very thin lamina cribrosa, plus the very mild exciting factor or factors ; the lamina cribrosa acting as a sort of compensatory valve to this mild transient precipitant.

C. Hess,[3] in a lucid article for practitioners, mentions that glaucoma is commoner in winter than in summer, possibly due to the contraction of the pupil in bright light. On this account he gives the warning that wearing dark glasses, by diminishing the contraction of the pupil, favours the onset of glaucoma. He calls attention to the fact that pain due to glaucoma may be referred to the teeth, and that he has seen teeth extracted for its relief. In cases of headache in elderly people, where there is reason to suspect the eyes, he advises the use of eserine. If it gives relief, it strongly suggests glaucoma as the cause.

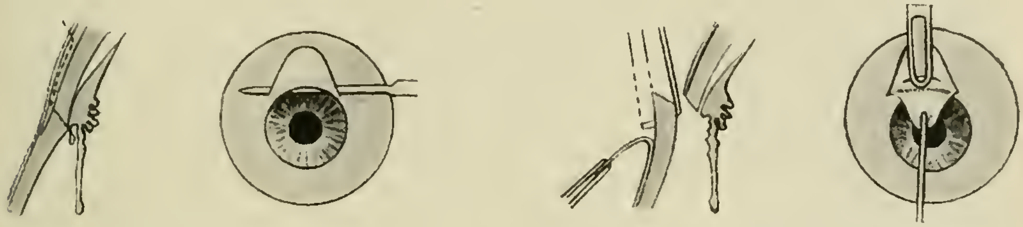
V. Morax[4] calls attention to the importance of recognizing orbitofacial pain, which resembles a deep bone pain, and to 'watering' of the eye as signs of a typical glaucoma. Such cases simulate a sinus or periosteal affection. In certain cases, one or both of these signs combined with change of intra-ocular tension, shown by the tonometer, will be the only indications of glaucoma.

Chronic Hereditary Glaucoma.—Plocher[5] writes on chronic hereditary glaucoma, in which there is a tendency to attack individuals at an earlier age in succeeding generations. The majority of those affected are myopes, whilst hypermetropes escape the disease. There is direct heredity and not a tendency to skip a generation. If any generation is spared, its descendents will probably escape. Careful prophylaxis is required, if a case occurs, to protect the other members of the family. Attention to the errors of refraction, measurement of the tension by the tonometer, etc., should be carefully carried out from time to time. The prognosis of such cases is bad usually, no certain means being yet known of arresting the disease.

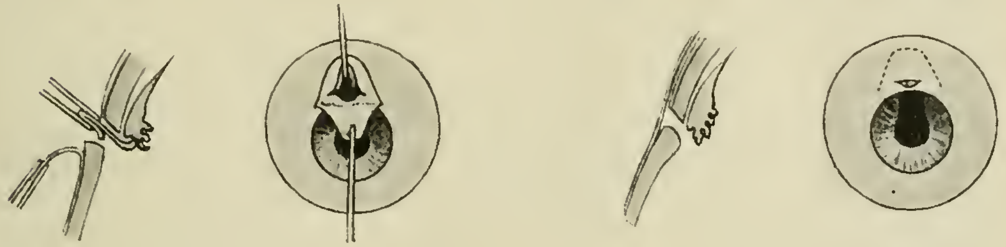
Glaucoma due to Homatropine.—Hambresin[6] publishes two cases of glaucoma in women of about 48 years of age due to the instillation of homatropine. Both were hypermetropes of about 3 D. ; the eyes were otherwise normal. [It is well that such cases are published to remind us of the necessity of using a miotic after homatropine.—A. E. J. L.]

TREATMENT.—A good deal has been written recently on the treatment of glaucoma, and the conclusions of the writers differ considerably. The evidence, however, seems to point to the general acceptance of some form of sclerectomy as the best treatment for glaucoma simplex, though advocates of treatment by miotics still exist. There is a good deal of difference of opinion still as to the best method of making the communication between the anterior chamber and the subconjunctival tissue. Elliot's method of removing a disc of sclera by means of a trephine, and Lagrange's method of cutting away a piece of sclera by means of a scissors or special punch, both having warm advocates. A short summary of some of the chief papers dealing with the subject follows.

Lagrange[7] writes that **Sclerectomy**, with **Iridectomy** either peripheral or total, is the best operation in chronic glaucoma. The sclerectomy should consist in the removal of a flap of sclerotic about 3 mm. long and a little less than 1 mm. wide. It must not be round. This is more easily accomplished by Vacher's punch than with scissors. Failures result chiefly in acute cases and in absolute glaucoma with very high tension. Elliot's trephining operation, though easier to do, is dangerous, as one may go too far forward on the cornea, which may give too thin a covering for the hole through the sclera, or too far back towards the ciliary body, which may be damaged. *Fig.* 41 indicates the essential steps of Lagrange's latest sclerectomy operation combined with iridectomy.



a, The incision. *b*, Removal of a portion of the sclera.



c, The iridectomy. *d*, Operation completed.

Fig. 41.—SHOWING LAGRANGE'S SCLERECTOMY OPERATION.

Asmus[8] gives an account of forty cases of **Trephining** by Elliot's method. One case of late infection appeared three months after operation which cleared up, without affecting the vision. Eighty per cent of the cases were successful, the tension being reduced to normal. He recommends the wearing of goggles for trephined persons to protect the eyes. After quoting authorities for and against trephining, he comes to the conclusion that the results of trephining are so good that we must not condemn it because of late infection, but seek to avoid this complication. [We have found the use of goggles in dusty weather, together with the use of a simple antiseptic lotion, usually boric lotion, which the patient can make for himself and so always have at hand, of the greatest use in the East, where there is often a good deal of dust. We are accustomed to tell our patients always to bathe the eyes after coming in from exposure to dust. They soon appreciate the comfort of it and do it willingly.—A. E. J. L.]

Von Gross[9] performed 1152 operations for glaucoma between 1913 and 1919. Elliot's operation was performed 401 times. Owing to the distance of the patients' homes from the hospital, the results were not always known. Late infection was infrequent. He thinks iridectomy will be the general operation of the future. Chronic inflammatory glaucoma with clear media and contracted fields may be trephined. In glaucoma simplex he will no longer trephine, but perform Lagrange's sclerectomy.

H. Butler,[10] as a result of several cases of late infection, gave up sclerotomy and treated a series of cases of chronic and subacute glaucoma by various forms of **Iridectomy**. Only 43 per cent of them were relieved by it. Sixty-four per cent of **Sclerotomy** cases to the same date were successful. He found that Holth's punch was more effective in reducing tension than the 1·5 mm. trephine, but late infection followed it more frequently. He now uses a 2 mm. trephine of his own design with gratifying results. He is impressed by the necessity for early operation, and is not yet convinced that miotics are of any permanent value in glaucoma. He recommends the use in an eye-bath of a 1–10,000 solution of **Oxycyanide of Mercury** every night, in cases which have been trephined for glaucoma, as a safeguard against late infection through the trephine hole.

Herbert's[11] later experience with his small-flap sclerotomy operation is that perfect filtration can be assured in mild untreated glaucomas. The failures have occurred in the more advanced cases with considerable tension, though in such cases there have been excellent results. He considers that the danger of late infection which sometimes occurs after sclerectomy operations, would be prevented if sclerotomy were done in suitable cases.

Elliot,[12] criticizing Herbert's paper, doubts the formation of a truly filtering cicatrix after sclerotomy ; he considers that late infection after trephining is due to faulty technique, and pleads that thick flaps should be made, in order to protect the trephined area adequately.

Brandt[13] reviews the operative treatment of glaucoma, and gives the statistics of the operations done in the eye clinic at Heidelberg. Taking into consideration the possible complications during and after the operation, he considers that trephining is indicated in simple, subacute, and secondary glaucoma. Iridectomy should be reserved for acute glaucoma, secondary glaucoma due to total posterior synechiæ, and for cases in which trephining is contra-indicated on account of affections of the conjunctiva or lachrymal passages.

Teulières and Pesme,[14] discussing the treatment of chronic glaucoma, conclude that the best method is sclerectomy with a peripheral iridectomy, to avoid incarceration of the iris in the wound.

Knapp[15] reports four cases of hypotony after trephining for glaucoma. He is of the opinion that too free filtration is injurious, and advocates the use of a small trephine and clean removal of the scleral disc.

References.—[1] *Amer. Jour. of Ophthalmol.* 1920, Sept. 673 ; [2] *Ibid.* 678 ; [3] *Münch. med. Woch.* 1921, May 6 ; [4] *Ann. d'Oculist.* clv, 1918 ; [5] *Monats. f. Augenheilk.* lx, 1918 ; [6] *Belgian Ophthalmol. Soc.* 1919, Nov. (abstr. *Ophthal. Literature.* 1921, June, 173) ; [7] *Arch. d'Ophtalmol.* 1920, Nov., 641 ; [8] *Zeits. f. Augenheilk.* xliii (abstr. *Brit. Jour. Ophthalmol.* 1920, 37) ; [9] *Zeits. f. Augenheilk.* xliii (abstr. *Brit. Jour. Ophthalmol.* 1921, Jan., 37) ; [10] *Arch. of Ophthalmol.* 1921, 1 ; [11] *Brit. Jour. Ophthalmol.* 1920, Dec., 550 ; [12] *Ibid.* 1921, 91 ; [13] V. Graefe's *Arch. f. Ophthalmol.* 1920, 95 ; [14] *Arch. d'Ophtalmol.* 1921, April, 233 ; [15] *Amer. Jour. Ophthalmol.* 1920, Jan., 87.

GLIOMA. (*See* Retina, Diseases of.)

GOITRE. (*See* Graves' Disease ; Thyroid Gland, Surgery of.)

GONORRHŒA.

Col. L. W. Harrison, D.S.O.

Bacteriological Diagnosis.—Kilduffe[1] rightly points out that a diplococcus which is Gram-negative and intracellular is not necessarily a gonococcus. The Gram-staining must be precise in detail and the organisms typical in shape. As a decolorizing agent, he has found that acetone for five to ten seconds bears out the claims made for it by its author, M. W. Lyon.[2] If alcohol is used it should be no weaker than 95 per cent, and not prolonged for more than two or three minutes. He believes the complement-fixation test to be a valuable aid to diagnosis, though it has a greater positive than negative value. E. O. Swartz and D. M. Davis[3] refer to Wherry and Oliver's discovery that gonococci grow better at a lowered oxygen tension,[4] and recommend a simple method of securing this condition. The tubes of agar p_H 7·4 with the addition of one-half pleuritic, ascitic, or hydrocele fluid, are corked with a rubber bung, which prevents evaporation and contamination, and allows the medium to be kept constantly in the incubator. After insemination, which should be as heavy as possible, the tubes are turned slope uppermost, passed three times through a Bunsen flame, and quickly recorked. On cooling, the pressure within becomes reduced by about $\frac{1}{10}$ of an atmosphere. Herrold[5] recommends cultures on plates. In order to secure reduced oxygen tension two plates are placed with their open sides opposed, one inoculated with *B. subtilis*, the other with the suspected secretion. A rubber band 2½ in. wide and 3½ in. in diameter encircles the plates and holds them together. The plates are poured on the same day and warmed for half an hour before use. The author finds provocative injections of silver nitrate into the urethra or of vaccine subcutaneously of no value in producing positive cultures. He regards the complement-fixation test as a valuable aid, but it must be taken in conjunction with clinical findings. Low grade reactions may persist for a year after the last positive smear or culture; he advocates, however, the keeping of the patient under observation until a negative result is obtained. The pus-cell content of smears and microscopic appearances of urine may be misleading, and by themselves constitute no safe index of cure.

TREATMENT.—E. O. Swartz and D. M. Davis[6] find that the gonococcus is killed in twenty minutes by **Mercurochrome-220** in a strength of 1–16,000, which is $\frac{1}{10}$ the strength at which it just kills *B. coli*. A point of practical importance is that solutions lose their bactericidal power on standing, a solution a month old killing gonococci only at 1–4000. L. T. Mann[7] believes that **Acriflavine** 1–4000 in physiological saline is the best irrigating solution we have. Out of 21 cases of anterior urethritis, 11 cases were cured in ten days. Four cases of acute antero-posterior urethritis were clear in an average of twenty-eight days. Chronic cases took considerably longer. A. H. McNair[8] recommends the injection of **Silver Nitrate** in increasing strength. He usually commences with 0·5 per cent, which is instilled with a glass pipette with a tapering neck 3 in. long and rounded off smoothly at the end. This is passed to its full length, and several syringefuls are injected at each sitting. A typical case received 14 treatments in as many days, the strength of silver nitrate being increased gradually to 1½ per cent when clinically cured; cure in sixteen days. In another case the strength was increased to 2 per cent.

Abortive Treatment.—Bayly[9] reviews the various methods of aborting gonorrhœa, and agrees with Ballenger, Koll, Marshall and Ffrench, Magian, and McDonagh in opposing as unnecessary the use of urethrovesical irrigation from the first as recommended by Harrison from the first day and by Janet from the third. [As to this, there is naturally room for difference of opinion; the reviewer has advocated urethrovesical irrigation as more likely to wash out the canal thoroughly while doing no harm.—L. W. H.] Bayly recommends the following method. During the first day half a drachm of **Collosol Argentum** (Crookes) is twice sealed into the urethra for three hours, with a six-hour interval between the two seals. For the next three days he irrigates the anterior urethra with two pints of **Potassium Permanganate** 1–3000 in the morning, and seals in collosol argentum in the evening. For the next five days the patient irrigates himself night and morning with 1–4000 potassium permanganate, and returns for a bacteriological examination on the tenth day, having omitted irrigation for one day and retained his urine for four hours.

If all is well, treatment is omitted, alcohol taken in moderation, and examinations made every other day for a week. The sealing-in requires some patience. The technique is as follows:—

Instruct the patient to empty his bladder.

Measure 30 min. of collosol argentum (which must be always kept in the dark when not in use) in a clean minim measure.

Pour into a small gallipot.

Sterilize a small, conical-nosed, glass urethra-syringe.

Wash the glans penis with methylated spirit and dry well with cotton-wool.

Apply a penis clip just behind the corona.

Pour some flexile collodion into a watch-glass or very small gallipot.

Compress the fossa navicularis by pinching the glans half an inch on each side of the meatus between the thumb and first finger of the left hand.

Instruct the patient to open the penis clip with the left hand while the colloidal silver is being injected with the doctor's right hand. After the silver has been injected instruct the patient to release penis clip.

Now, well dry the area of glans round meatus, and between the pinching thumb and finger, with absolute alcohol and dry wool.

Apply the collodion with a small glass rod between lips of meatus and over the whole area between the pinching thumb and finger, taking care to cover ¼ in. behind and in front of meatus.

Dry by blowing, and apply another layer, and repeat a third time.

Now, gently release the pinching fingers, and note if there is any escape of fluid. If there is, put a 'patch' of collodion flexile over the point of escape of fluid after stopping the leak by pinching again, and well drying with cotton wool.

After all leaks have been stopped, gently loosen penis clip. There should be no further leak, but if there is, it will have to be treated as before.

Let the seal dry and harden for five minutes before permitting the patient to leave.

The patient is given a little acetone and told to remove the seal in three hours.

Boyd[10] recommends the following abortive treatment for cases earlier than the third day. Inject **Collargol** 1·5 c.c., **Glycerin** 30 c.c., **Distilled Water** 250 c.c.; this is held in the urethra for four to five minutes. Three or four hours later inject a dozen times with 1–3000 potassium permanganate, the last amount being retained for five minutes. Two hours later the collargol injection is repeated, and five hours after this the permanganate. He claims that, after the third day, the discharge disappears completely in from six to eight days.

Vaccine Treatment.—Boyd[11] tried the effect of **Mixed Gonococcal and Staphylococcal Vaccines** (1 gonococcal to 3 staphylococcal) in three series of fresh cases of gonorrhœa. The first 270 received every third or fourth day a dose rising from 10 million gonococci with 30 million staphylococci to 200 million gonococci and 600 million staphylococci. All received local treatment. The results, compared with 200 cases without vaccines, showed a slight advantage in favour of the latter in regard to duration of stay in hospital: 54·5 days non-vaccine series, and 58·6 days vaccine. Epididymitis: 4·5 per cent non-vaccine, and 2·96 per cent vaccine. Prostatitis: 10·5 per cent non-vaccine and 18·5 per cent vaccine. In a second series the doses were much larger, commencing with 50 million gonococci, 150 million staphylococci, and working up in three further doses to 200 million gonococci and 600 million staphylococci, after which staphylococci were omitted but the dose of gonococci increased during four further injections to 750 million. The results again showed no advantage in 44 vaccine and 36 control cases. The duration in hospital was: 56 days non-vaccine and 63·4 days vaccine. Prostatitis: 11·1 per cent non-vaccine against 9·1 per cent vaccine. Epididymitis: nil in the non-vaccine cases, against 4·54 per cent in the vaccine. The author rightly remarks, however, in regard to duration of stay in hospital, that, in each series, a large number of the non-vaccine cases had not completed their stay in hospital and were excluded from the statistics. He does not think this sufficient to alter his opinion that the vaccines did not affect the course of the disease. [The investigation is open to the serious objection that, in the first series, the cases were under different medical officers, with, naturally, different standards of cure. The reviewer has experience of the fact that there may be as much as thirty-five days' difference in the duration of stay in hospital of military patients under the same lines of treatment, depending on the standard of cure adopted. Also, if a control series is taken for comparison, it should not only be under the same medical officers, but the investigation is naturally not complete until the last case has left hospital.—L. W. H.]

Reenstierna[12] has improved on the **Antigonococcus Serum** he advocated in 1916. On the basis of the sensibility of the gonococcus to heat, he has added to his antigonococcus serum dead cultures of **Typhoid Bacilli.** He claims that the modification is a great improvement on the original, causing marked and prompt amelioration of symptoms in arthritis, prostatitis, and epididymitis, followed in a short time by cure. The injection is followed by chills and high fever, with considerable local tenderness.

Test of Cure.—J. M. Cadwallader and A. A. Brown[13] claim that satisfaction of the following criteria justifies pronouncement of cure, and state that they have followed up many of their patients without a single instance being discovered of subsequent transmission of infection. All three urines clear; three smears of entire urethra and appendages taken on alternate days negative; no granulations or inflammation of the verumontanum on urethroscopic examination; prostate and vesicles normal to touch; urethra normal in calibre. Patients who pass these tests are put on probation for six weeks, and if the urine remains clear and sparkling no further tests are required. The authors do not define their attitude to the patient with threads in the urine but no gonococci; those are the difficult cases. E. T. Clarkson[14] makes a strong plea for the application of a very rigorous test of cure of gonorrhœa. The procedure recommended for males is first provocative, as follows: (1) About five days after the patient is believed to be cured the prostate and vesicles should be massaged. This is sometimes followed by a discharge, owing to auto-infection. (2) Treatment is then suspended for ten days, during which the patient has indulged in alcohol or ginger-beer, and condiments. A large sound is passed and the anterior urethra massaged over it; after removing the sound, the prostate and vesicles are massaged and the patient passes urine. Silver nitrate, gr. x to ℥j, is instilled and the anterior urethra painted with the same solution. A few hours after the reaction following this treatment has subsided, a dose of gonococcal vaccine may be administered. Assuming that these provocative measures have resulted in no flare-up of the urethritis, the patient is told to present himself for final tests, having retained his all-night urine, or having held it for at least five or six hours. It is assumed that the urethroscope has detected no abnormality. The meatus is sterilized and the urethra milked from the perineum forwards. A smear and culture are made of any secretion. The first and third portions of urine are passed into a sterile jar, and films and cultures made of any threads or flakes in it. Each lobe of the prostate is massaged, first with firm, straight strokes from the periphery to the apex; then by a rotary, kneading movement; and lastly by straight strokes. Each vesicle should similarly be massaged by a rotary, kneading action. These examinations are made twice at an interval of a week, and if neither pus nor gonococci are found the patient is discharged. If pus only is found a third examination is made, and the patient discharged on this proving negative for gonococci.

Secondary Infection of the Prostate.—T. and W. Meerschmidt[15] found by cultural and microscopical examination in 42 cases of chronic prostatitis, 19 different kinds of bacteria, including *Staphylococcus albus* and *aureus*, pneumococcus, *M. catarrhalis*, *M. tardissimus*, *B. coli*, *B. pseudo-diphtheriticus*, and sarcinæ, while gonococci were found only three times, though all the cases were originally gonococcal. **Autogenous Vaccines** gave good results.

Gonorrhœal Rheumatism.—Spakler[16] discovered 25 cases of rheumatism in 1318 patients with gonorrhœa attending v. Zumbusch's clinic in two and a quarter years (1·75 per cent), a proportion which corresponds to that found by most other authors, though he rightly remarks that many cases of gonococcal rheumatism must escape the notice of the specialist in gonorrhœa through being retained by the general physician. He gives as soon as possible **Methylene-Blue Silver,** sold under the name of **'Argochrom'** (Merck). Argochrom contains 18 to 20 per cent silver, and can be given intravenously without risk ; it has also been used with success in sepsis and ordinary rheumatism by Edelmann and v. Müller.[17] On the first day is given an injection of 6 to 10 c.c. of milk or of a good protein preparation. Instead of this a gonococcal vaccine such as **Gonargin** 25 million, or 0·5 c.c. **Arthigon,** can be given intravenously. Immediately after the rigor which follows, or on the next day, 10 c.c. of a 1 per cent solution of argochrom are given intravenously. These injections can be repeated two or three times. Stress is laid on the importance of local treatment of the urethra. Dufour and Debray[18] aspirate the fluid and inject it subcutaneously. They claim rapid relief of pain from this procedure, and the temperature gradually subsided. W. Mobitz[19] claims excellent results in gonococcal arthritis from puncture of the joint followed by irrigation and injection of a solution of 1–5000 **Vuzin** (a derivative from the bark of *Rimija cuprea*). His cases have been under observation in a clinic at Magdeburg since October, 1919.

Ophthalmia Neonatorum.—H. Heinemann and K. Wilke[20] recommend, in addition to local treatment, the intramuscular injection of **Caseosan** 0·5 to 1·0 c.c. repeated two to four times. They began their experiments with milk injections, and later changed over to caseosan.

GONORRHŒA IN WOMEN.

Diagnosis.—W. E. Stevens and M. Heppner, in a paper read at the Section on Urology, 71st Annual Session of the American Medical Association, April, 1920,[21] said that at the diagnostic clinic established in San Francisco for the examination of prostitutes and other delinquents, they had found 1496 out of 3439 (43·5 per cent) suffering from gonorrhœa. In the first 2375 cases the diagnosis was based on positive smears or double or treble plus complement fixation, and in 1064 they relied only on clinical evidence. Of the positive cases, 47 per cent had cervicitis, 32 per cent urethritis, and 23 per cent bartholinitis. In cases of cervicitis positive smears were more likely to follow compression of the lips of the cervix between the lips of a bivalve speculum. In 50 cases which were clinically positive but gonococci not found at the first examination, other organisms discovered were staphylococci, predominant in 36 ; various diplococci in 29 ; streptococci in 9 ; diplobacilli in 2 ; and other bacilli in 7. They consider that proper cauterization of the cervix repeated two or three times is likely to yield the best results, and claim that 60 per cent of their cases without demonstrable pelvic involvement were free from infection after this procedure. For the examination of Skene's ducts they recommend a skenoscope and a filiform bougie. They found urethral strictures in 58 per cent of their cases of urethritis, a very high figure in comparison with usual findings. They devoted particular attention to bartholinitis, which was found, as mentioned, in 23 per cent of their positive cases. They recommend a filiform bougie for exploration of the duct of Bartholin, which was commonly strictured. A palpable gland is usually infected, and they advise its removal even though gonococci are not found. In 29 out of 52 cases in which the gland was removed though no gonococci had been found, these organisms were later discovered in the secretion from the wound. In the discussion following this paper most of the speakers favoured enucleation of Bartholin's gland for chronic infection, and emphasized the importance of destroying Skene's ducts. Ballenger favours destruction of cervical glands by high frequency, but Stevens thought it not so good as the actual cautery. Nethen (New Orleans) referred to the frequency of rectal gonorrhœa in women.

Treatment,—Gonorrhœa in women is notoriously difficult to treat, and this, combined with the difficulty of determining in the face of a purulent discharge when the gonococcus has finally disappeared, has made many pessimistic of ever achieving a cure. Those who have the opportunity of treating and observing patients under good conditions know that much of the pessimism is groundless, since attention to detail and observance of surgical principles is eventually rewarded by success in eliminating the gonococcus. R. Hobbs[22] has used the opportunities afforded him of being able to keep his patients under observation in hospital, to elaborate a line of treatment which promises much better results than are commonly attained. His method may be said to follow the surgical principle of securing drainage of the infected parts and of encouraging the removal of the gonococcus from the depths of the tissues by promotion of an outpouring of lymph. On the same principle he avoids the use of caustic remedies, which are so much favoured by writers on female gonorrhœa. He believes, with the reviewer, that strong caustics fail to reach the gonococcus, and, by causing a surface coagulum, interfere with drainage. The treatment is as follows. After thorough cleansing of the external parts with ether soap and water, the urethra is irrigated with **Potassium Permanganate,** and every five to seven days swabbed out with **Glycerin** 8 and **Tr. Iodi** 1. A Fergusson's speculum is passed, and the vagina swabbed out with ether soap and water (1 drachm to the pint) and then with physiological salt solution, after which it is dried carefully, leaving the vaults as dry as possible. The cervix is swabbed with tr. iodi in glycerin, a strength of 1–8 being used at first, and increased to equal parts. When the discharge has become mucoid, the intervals between swabbings are increased, and an astringent solution, such as 0·5 per cent **Picric Acid** or one of the **Silver** preparations, is used. If the catarrh persists, the cervix is packed at intervals of a week with a strand of gauze soaked in **Lin. Iodi** 3, **Glycerin** 1, the strand being 3 in. long, with a hood at the top (to facilitate introduction with a Playfair's probe) and a tail for removal ; the strand is left in for six hours. In cases where the infection still persists, the patient is first anæsthetized, and after thoroughly aseptic preparation, the cervix is dilated to no more than No. 7 Hegar. After this a small rubber catheter is passed to the fundus and the cavity syringed out with lin. iodi. following which a strand of gauze 6 in. by 1½ in., soaked in equal parts of tr. iodi and glycerin, is introduced into the uterus. The patient is kept in bed for a week, the strand being removed after six hours, and vaginal swabbings are recommenced after two days. The treatment is repeated every month. During pregnancy the cervical treatment is carried out fortnightly up to the seventh month, the plugs being retained for one hour, and the uterine cavity is treated as above as early as the third week of the puerperium. The results as shown by the case records have been very good, and the improvement in cases of salpingitis has been particularly striking. [The treatment outlined above has been tried at St. Thomas's Hospital under the reviewer's supervision, and the results have so far borne out the claims advanced for it. It is possible in some cases to dispense with the anæsthetic, no mechanical dilatation being employed; but the pain on syringing is rather severe.—L. W. H.]

Haendl[23] considers that the failure of **Choleval Bougies** (colloidal silver 2 per cent, and sodium choleinate 7·5 per cent) to control cervical gonorrhœa is largely due to the fact that the bougies are often expelled long before they have had a chance to act on the mucosa. For this reason he recommends that the choleval bougie be pushed right into the uterus. He has seen no harm result from this, and its advantage is that the choleval continues to medicate the cervix until the last trace of it has been expelled from the uterus. The effect is also to some extent mechanical, since the disengagement of gas bubbles helps mechanically to remove the gonococci. Recently he has practised packing the uterus with choleval bougies, pushing in one after the other until two to four have been inserted. The author does not state how frequently the procedure is repeated.

W. A. N. Dorland[24] has found gonococcal urethritis in only a few out of 20,000 cases. He claims good results from **Methylene Blue,** which he has used for fifteen years. After cleansing with water and saline, the canal is dried and swabbed with 1 per cent methylene blue. If the internal os is patulous, the swab is passed to the fundus and the dye rubbed in thoroughly. Following this the entire external surface of the cervix and the vaginal wall are swabbed with a pledget of wool soaked in 1 per cent methylene blue. A pledget of wool held at the posterior commissure catches the fluid as it escapes while the patient is told to bear down. The colour has gone in twelve to twenty-four hours. In the case of urethritis the canal is similarly swabbed, and a cure is usually obtained in two or three treatments. The patient refrains from douching the same night, and then irrigates twice daily with solution as hot as can be borne, until the next visit. The swabbing is practised twice weekly, and a cure is claimed in five to six weeks.

F. Ivens[25] claims excellent results from the use of **Antigonococcal Serum** in female gonorrhœa. Some cases received 20 c.c. of the serum, diluted in normal saline, and injected subcutaneously every two, three, or seven days to a total of 20 to 200 c.c. In others with dripping pus tubes or a pyosalpinx the tubes were washed out with normal saline and then injected with 20 c.c. serum. The abdomen was closed, the Fowler position adopted, and a subcutaneous or rectal saline injection given to avert anaphylaxis. A third series was treated with vaginal packs of serum alternating with packs of 10 per cent saline and 5 per cent carbolic; these cases did particularly well.

Test of Cure.—A preliminary provocative treatment is instituted as in men ten days after suspension of curative treatment, dilating the urethral and cervical canals, and applying silver nitrate to the cervix, urethra, glands of Bartholin, and Skene's tubules. In regard to vaccines, he recommends caution for fear of a salpingitis flaring up. After this provocative treatment, the final tests are as follows: (1) The vulval region, and especially the meatus urinarius and the orifices of Bartholin's ducts, should be thoroughly cleansed with sterilized water. The posterior wall of the urethra should be gently massaged (per vaginam) in order to express secretion. A platinum loop should be introduced into the urethra, and from the specimen of secretion obtained a film should be made and a culture tube inoculated. (2) Pressure should be exerted along the ducts of Skene and Bartholin and a specimen obtained by means of a pipette. The patient should micturate after a retention of at least six hours. (3) The uterus should be grasped bimanually, and pressure exercised downwards towards the cervix. (4) A speculum is then introduced, and the fornices and external surface of the cervix should be cleansed with sterilized distilled water. The cervix should be subjected to some form of massage, and a film made and culture tube inoculated from the resultant secretion. Even when the patient has passed these tests three times she should not be discharged, but brought back again after three months and the whole procedure repeated.

In the discussion on this paper Lees objected to the use of silver nitrate on account of its effects on the very delicate parts under consideration. Harrison advocated the greater use of cultures.

References.—[1]*Amer. Jour. Med. Sci.* 1921, April, 578; [2]*Jour. Amer. Med. Assoc.* 1920, Oct., 9; [3]*Ibid.* lxxv, 1124; [4]*Jour. of Infect. Dis.* 1916, xix, 288; [5]*Jour. Amer. Med. Assoc.* 19 1, lxxvi, 225; [6]*Ibid.* 1920, lxxv, 844; [7]*Med. Record*, 1921, Jan. 22, 144; [8]*N.Y. Med. Jour.* 1920, Oct. 2; [9]*Practitioner*, 1921, June, 41; [10]*Jour. des. Prat.* 1920, Oct. 16 (abstr. in *Practitioner*, 1921, March, 221); [11]*Jour. R.A M.C.* 1921, Jan., 459; [12]*Jour. of Urol.* 1921, v, 63 (abstr. in *Surg. Gynecol. and Obst.* 1921, May, 424); [13]*N. Y. Med. Jour.* 1920, Oct. 2, 491; [14]*Brit. Med. Jour.* 1921, ii, 483; [15]*Deut. med. Woch.* 1920, xlvi, 1416; [16]*Münch. med. Woch.* 1921, June 3, 668; [17]*Deut. med. Woch.* 1917, No. 23; [18]*Bull. de la Soc. méd. des Hôp.* 1920, No. 35 (abstr. in *Jour. Amer. Med. Assoc.* 1921, lxxvi, 411); [19]*Münch. med. Woch.* 1920, July 16, 843; [20]*Ibid.* 1921, No. 5, 143; [21]*Jour. Amer. Med. Assoc.* 1920, lxxv, 1477; [22]*Practitioner*, 1921, Jan. 31; [23]*Münch. med. Woch.* 1921, April 29, 519; [24]*Illinois Med. Jour.* 1920, xxxviii, 114 (abstr. in *Surg. Gynecol. and Obst.* 1921, Jan., 52); [25]*Brit. Med. Jour.* 1921, i, 77.

GOUT. (*See* RHEUMATISM AND GOUT.)

GRANULOMA INGUINALE.

E. Graham Little, M.D., F.R.C.P.

Campbell[1] reports 5 cases occurring in negroes, seen at the Bellevue Hospital, New York. In 4 of the 5 cases the encapsulated bacilli known as Donovan's bodies were demonstrated. There was usually a history of injury, and quite frequently of bubo. The specific treatment is the administration of **Tartar Emetic.** The solution used is a 1 per cent strength, prepared thus: 5 grm. of antimony and potassium tartrate is dissolved in 500 c.c. of distilled water; the solution is then passed through a Berkefeld filter until, on culture, it is sterile; 0·5 c.c. of hydrochloric acid is added to prevent precipitation. The author's practice at Bellevue Hospital has been to begin with about 2 c.c. of the tartar emetic solution diluted with 8 c.c. of sterile distilled water. The injections are given intravenously three times a week, 1 c.c. more of the antimony solution and 1 c.c. less of the water being used at each treatment until the full strength (1 per cent) is given. With the 1 per cent solution they have not given more than 12 c.c., although others have used as much as 20 c.c. at a time. They have noted that, when given on successive days, a moderate reaction occurs the second day.

At present they can record but one cure. A course of treatment covers from six to eight weeks.

Reference.—[1]*Jour. Amer. Med. Assoc.* 1921, March 5, 648.

GRAVES' DISEASE. (*See also* ENDOCRINOLOGY; *and* RADIOTHERAPY.)

Herbert French, M.D., F.R.C.P.

Improvement Subsequent to Severe Local Infection.—In view of the fact that infections of any sort have a very deleterious effect upon the thyroid, and that infection has been given an important rôle in the etiology of Graves' disease, the occurrence of improvement as a result of infection may seem paradoxical. In a series of 156 cases of acute rheumatism under his observation, Vincent[1] reported that 86, or 68·3 per cent, showed painful enlargement of the thyroid gland, which disappeared with the symptoms of rheumatism. Jennings[2] has reported two cases of measles occurring in patients with pre-existing Graves' disease. In one, who had marked hyperthyroidism, death resulted. In the other, in whom the hyperthyroidism was mild, the condition of the thyroid was so aggravated that four weeks later operation became necessary. It is therefore interesting to read of the two cases reported by

Squier.[3] The first of these was a woman who for nearly a year had shown all the symptoms of well-marked Graves' disease. In March, 1917, she developed an attack of acute tonsillitis, which very nearly proved fatal. After recovery she improved greatly. By May she had gained 5 lb., palpitation was less, and the thyroid was no longer palpable. In January, 1918, she had gained 36 lb., and had no symptoms or signs of Graves' disease. The second case was that of a man who in October, 1919, was admitted to hospital with all the symptoms and signs of well-marked Graves' disease. In January, 1920, subsequent to acute rhinitis, acute mastoiditis developed, and drainage was performed. After this he steadily improved, and by April all signs of his Graves' disease had vanished. Squier in his summary suggests that the improvement may be due to actual loss of secretory tissue owing to post-infectious sclerosis of the gland.

REFERENCES.—[1]*Comptes rend. Soc. de Biol.* 1907, lxiii, 399; [2]*Lancet,* 1918, i. 906; [3]*Amer. Jour. Med. Sci.* 1920, Sept., 358.

HÆMATEMESIS, TREATMENT OF. (*See also* STOMACH, SURGERY OF.)

Robert Hutchison, M.D., F.R.C.P.

In mild cases Decker[1] recommends simply *complete rest,* the stopping of all food by the mouth, and the administration of small doses of narcotics. He considers the application of an ice-bag to the epigastrium useful because it tends to keep the patient quiet. In order to promote coagulation, he believes in the subcutaneous injection of **Gelatin** (40 cc. of Merck's sterilized gelatin). Combination with calcium chloride fortifies the action of the gelatin, and such a combination is sold under the name of **Kalzine,** the dose being one ampulla of 10 cc. subcutaneously. The intravenous injection of **Hypertonic Salt Solution** is also helpful (5 cc. of 10 per cent salt with half per cent calcium chloride). In cases in which there is pyloric blocking causing the accumulation of blood and secretion in the stomach, lavage is certainly of advantage. It should be carried out with small quantities of water at the temperature of the room.

Kelling[2] is of opinion that the dangerousness of hæmatemesis is usually under-estimated. In bleeding from callous ulcers, especially in the male, the mortality is very considerable. The margin of safety also is small, for whereas the loss of one-third of the total blood volume is well borne, the loss of one-half is fatal. A second bleeding, therefore, coming on after the patient has rallied from the first, is apt to lead to sudden collapse. In severe cases, in addition to the ordinary means, this author believes in **Applying Pressure** to the lower end of the duodenum, thus preventing blood from flowing into the bowel. This is done by applying a roll of cotton-wool longitudinally along the middle of the abdomen and keeping it in place by a light binder. On top of this is placed a sand-bag weighing 5 to 10 lb. The end of the bed should be raised. The pressure may be maintained for several hours if necessary. If the bleeding does not stop, operation should not be too long delayed, and a direct attack made upon the bleeding point.

REFERENCES.—[1]*Münch. med. Woch.* 1920, Oct. 1, 1149; [2]*Ibid.* 1920, Oct. 15, 1198.

HÆMOPHILIA. (*See* NON-SPECIFIC PROTEIN THERAPY.)

HÆMORRHOIDS, INTERNAL.

J. P. Lockhart-Mummery, F.R.C.S.

PALLIATIVE TREATMENT.—This consists in relieving the symptoms and in treating slight attacks of piles which are not sufficiently bad to justify operative interference. When a patient, however, is suffering from piles which give more or less constant, or intermittent, trouble, it is always wiser to advise operation, unless there are some special contra-indications.

Treatment consists in prescribing some **Astringent**, which may be **Hazeline, Gall** and **Opium, Adrenalin** or any of its derivatives, etc., either in the form of a lotion or ointment. Ointments and suppositories are very popular owing to the ease with which they can be used, but they have the objection that if the piles are liable to prolapse they are apt to increase this tendency and enable the piles to slip down more easily. Adrenalin in some form or another has a marked effect in checking hæmorrhage from piles, but I feel certain that if used for any length of time it tends to make the piles worse, as the constriction of the vessels caused by the drug is followed by a counter-relaxation.

Careful attention to the action of the bowels by suitable aperients is very important in alleviating symptoms. Where, however, careful treatment only results in alleviating the symptoms as long as the treatment is carried out, the patient will soon demand that something further be done, and we have to consider what forms of treatment, short of operation, offer any possibilities of a cure.

The best-known method, and the one which has been most widely practised, is that of **Injection** of the piles with a solution designed to form an aseptic thrombus. This treatment has now been carried out for a great many years with a considerable degree of success. Various solutions have been used : by far the best is a strong solution of **Carbolic Acid** and **Glycerin.** The most common is 20 per cent carbolic, and a few drops of this are injected into each of the piles at intervals of some days or a week, until the piles are gradually obliterated. The treatment is not particularly easy, and requires a good deal of practice to carry out successfully. If properly done it is free from risk and does not in any way incapacitate the patient during treatment. Recently other solutions have been recommended, such as **Alcohol** and solutions of **Urea-Quinine-Hydrochloride.** These, however, are not so satisfactory, and are far more liable to cause sloughing, which should not occur if the treatment is done properly with carbolic acid.

The injection treatment of internal hæmorrhoids is curative only in a sense. Recurrence within from six months to a couple of years is the rule rather than the exception, and the treatment has to be repeated. It gives, however, enormous relief, it should be painless, and has advantages in certain cases.

Another palliative method of treating piles is by **Electrolysis.** This method has been revived during this year in a paper published by Curtis Webb.[1] It consists in causing coagulation within the pile by passing a current of about 12 to 15 ma. through zinc needles introduced into the piles. The treatment does not appear to have any advantages over the injection treatment, and it is certainly more complicated. For this reason it has never been popular.

Operative Treatment.—There is no doubt that at the present day the operation of choice is that known as the **Ligature** operation, a modification of the operation performed by the Allinghams. If properly performed this operation gives admirable results, the minimum of pain, and is practically free from complications. The most important improvement of recent years in the performance of this operation is that it is performed aseptically. Almost all the pain that has resulted from it in the past has been due to sepsis, which is entirely preventable.

The **Clamp and Cautery** operation still has its advocates, and is undoubtedly very satisfactory ; but it is not so generally suitable as the ligature operation, and hæmorrhage appears to be rather more frequent as a complication.

Whitehead's operation is now hardly ever performed.

A discussion took place this year at the meeting of the British Medical Association at Newcastle on "The Operative Treatment of Internal Hæmorrhoids", the discussion being opened by Sir Charles Gordon Watson. He analyzed the results of 1000 cases of piles treated at St. Mark's Hospital, London :—

536	cases	were	treated	by the	ligature operation
15	,,	,,	,,	,,	clamp and cautery
9	,,	,,	,,	,,	Whitehead's
440	,,	,,	,,	,,	palliative measures
1000					

In the whole 1000 cases there were only 2 deaths, from bronchopneumonia not necessarily due to the operation, or a percentage of 0·3. Recurrence percentage requiring re-operation was 1. Secondary hæmorrhage occurred in 1 per cent, and secondary complications requiring operative interference occurred in 11 cases. The general opinion was that Whitehead's operation is not justified and has no advantages; it also was in favour of the ligature operation, although a few still preferred the clamp and cautery.

The time patients were kept in bed varied very much. Most of the English surgeons preferred from ten days to a fortnight, and some even three weeks. The American surgeons allowed their patients up two days after operation. It was generally agreed that the best time to get the bowels open was about the third day following the operation.

Reference.—[1]*Brit. Med. Jour.* 1921, March 26.

HARE-LIP.

Sir W. I. de C. Wheeler, F.R.C.S.I.

Hare-lip which has been properly corrected should fulfil the following requirements: (1) Integrity of the cutaneous zone; there should be no encroachment of mucosa on this area. (2) Continuity of the muco-cutaneous line; absence of 'wedging'. (3) Rectitude of the free border of the lip; no notches, no protuberant points. Veau and Ruppe,[1] in advocating the Jalaguier procedure, point out that defects in these requirements are amongst the most constant of the disappointments to be met with after the Mirault operation, so popular in France. They affirm that every hare-lip which has been incorrectly operated upon can be definitely re-corrected by the Jalaguier method, with as good results as if there had been no earlier operation. The flap A B C (*Fig.* 42) is cut first, then the opposite lip border is freshened (*a b c*) to correspond exactly. The line A B should have exactly the same length as the line *a b*. The points B and *b* should be placed exactly above the mucocutaneous border. This point is of capital importance. The two angles A B C and *a b c* should each correspond practically to a right-angle. Having marked out these essential incisions, one traces the rest of the incision, which has not quite the same importance. The dotted line A *a* is cut down to, but not through, the mucosa; the block of tissue so marked out is resected, exposing the muscles of the lip, which are best sutured (*Figs.* 43, 44) by two or three fine catgut strands. The mucocutaneous line is now accurately fixed by suturing B to *b*, the most important points of all. Suture of the skin margin is carried out by carefully-placed stitches of fine silk, such as are used for arterial suture. One should remember that the scar will always be visible, hence accurate marginal apposition is essential. The mucous stitch rarely leaves any visible scar. Approximation is effected with horsehair.

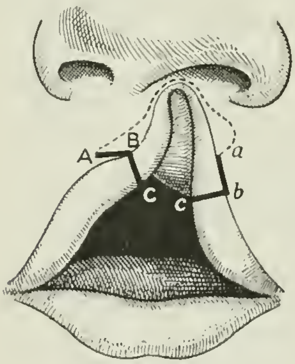


Fig. 42.—Veau and Ruppe's operation for hare-lip, showing the incisions. Those marked A B C, *a b c* in heavy lines are the important ones. That indicated by the dotted line A *a* is only a freshening incision; it is enough to say that it must not pass through the mucosa.

Stettiner[2] opposes Drachter's view that in bilateral hare-lip the same operative method should be used as in the unilateral form, and that from six to eight weeks after the operation on one side the second operation should be done on the other side. Stettiner emphasizes that in all cases in which the middle portion of the lip between the clefts is too small—which is usually the case—skin tissue from either side may be taken to widen the lip. He doubts whether Drachter's method will give a good cosmetic result. He thinks the Hagedorn procedure is here the method of choice—possibly with slight modifications.

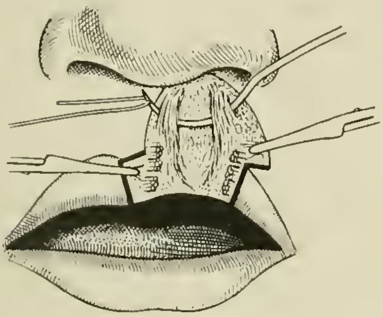


Fig. 43.—The lips of the wound are turned back, exposing the muscles on either side; these are then sutured.

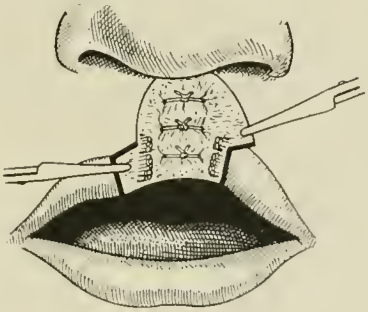


Fig. 44.—Suture of the muscles completed.

If the incisive bone protrudes it should be set back by subperiosteal division of the vomer, as recommended by Bardeleben. As to the time for operating on hare-lip, that depends mainly on the general condition of the child. If the general condition is good, Stettiner has found the first week after birth, and more especially the fifth day, to be opportune. One big advantage of early operation is that the members of the family are relieved of the thought of the child having a deformity. However, it is possible to wait until the third or fourth month, provided other indications such as cleft palate, malnutrition, tendency to bronchitis and bronchopneumonia, etc., do not demand earlier intervention.

References.—[1]*Presse méd.* 1921, April 23, 231; [2]*Centralb. f. Chir.* 1921, July 31 (abstr. in *Jour. Amer. Med. Assoc.* 1920, Nov. 20, 1462).

HAY FEVER.

Arthur Latham, M.D., F.R.C.P.

Frequent Causes and the Treatment of Perennial Hay Fever.—I. Chandler Walker,[1] in an article on this subject, draws the following inferences:—

Perennial hay fever is frequently caused by animal emanations, and cutaneous tests should be made with the common animal epidermal proteins.

Those patients whose hay fever is caused by exposure to horses may be successfully treated by **Repeated Inoculation** in gradually increasing amounts of the particular **Epidermal Protein** to which they are most sensitive.

Those patients who are sensitive to cat-hair protein may be treated similarly with equal success. Dispensing with the cat, however, is easier of accomplishment, and is usually beneficial. With those who are sensitive to the epidermal proteins of other animals (pets), it is preferable to avoid that particular animal. Sensitization to feather protein from feather pillows is frequent, and the substitution of floss pillows is desirable.

Perennial hay fever is frequently caused by the ingestion of foods and by the inhalation of the cereal grain flours. Cutaneous tests often reveal such a cause, and omission of the protein is the desirable mode of treatment.

Patients who have seasonal pollen hay fever frequently have paroxysmal symptoms throughout the year. Satisfactory pre-seasonal treatment with the particular **Pollen** that causes the seasonal hay fever frequently relieves the perennial symptoms.

Recurring head colds are frequently coincident with the foregoing sensitizations. This type of head cold is probably not due to an infection, but rather a result of sensitization which renders the nasal mucous membrane easily irritable.

Non-sensitive patients with perennial hay fever or vasomotor rhinitis, provided there are no demonstrable abnormalities, growths and the like, in the nasal cavities or sinuses, are sometimes benefited or relieved by **Autogenous Vaccines** made from the nasal secretion. The same statement also holds true for patients who are subject to frequent head colds.

Olfactory vasomotor rhinitis, or pseudo *hay fever*, caused by mechanical, thermal, chemical, and odorific irritants, is not uncommon, and should be recognized.

The ingestion of foods may cause symptoms referable to the eyes alone. Therefore, although protein sensitization should not be considered as a 'cure-all' or a cause of all obscure conditions, the cutaneous test for protein sensitization deserves a place among diagnostic tests; and when properly performed and interpreted, it is a very useful test.

REFERENCE.—[1] *Jour. Amer. Med. Assoc.* 1920, Sept. 18, 782.

HEADACHE, OVARIAN. (*See* OVARIAN HEADACHES.)

HEART, METHOD OF EXPOSING. (*See* THORACIC SURGERY.)

HEART DISEASE, PREGNANCY IN.

Carey F. Coombs, M.D., F.R.C.P.

The gist of Sir James Mackenzie's four papers[1] is difficult to convey in an abbreviated form, but his chief contention is that "as the danger attending pregnancy in women with heart disease is the occurrence of heart failure, the physician must keep clearly before him the symptoms by which this can be recognized". The detection of a mitral systolic murmur, for example, in a woman who is pregnant or who may become pregnant, calls for consideration of the response to effort, the size of the heart, and the rhythm of the heart. If the response to effort is good and the heart not increased in size, then the bruit is probably physiological, or at all events needs no further consideration. "If there be an increase in the size of the heart, but no diminution in the response to effort, and if the circulation is well maintained, then pregnancy may be allowed, even if there be a history of rheumatic fever." If the heart is enlarged and the response to effort limited, one should ask oneself whether there is an actual lesion of the myocardium. If there is without doubt such a lesion, pregnancy is inadmissible. Of the various forms of irregular pulse that may appear in such a case, that of auricular fibrillation is the only one calling for special note, and this is an absolute bar to pregnancy.

As to mitral stenosis, the form of cardiac disease most often complicated by pregnancy, Sir James Mackenzie's advice is set forth in a series of stages as follows: —

"*a.* When, ten or fifteen years after the causative rheumatic attack, there is only a presystolic murmur, with no signs of œdema of the lungs, and the response to effort is good, then the outlook is favourable. Such an individual can be permitted to become pregnant with fair assurance of safety.

"*b.* When there is not only a presystolic murmur, but also a diastolic murmur. If the heart is normal in size and not too excitable, and if it is capable of a fair response to effort, then pregnancy may proceed. The patient, however, should lead a somewhat restricted life, avoiding especially such effort as brings on breathlessness or palpitation.

" *c.* When, even with a short presystolic murmur, and many years after the causation of mitral stenosis, there is marked inefficiency of the heart, shown by breathlessness on slight exertion, rapid pulse or easily excited palpitation, then there is danger in pregnancy.

" *d.* When the heart is large or irritable, and when effort readily induces palpitation and breathlessness, even if there be no diastolic murmur, then pregnancy should be forbidden. If, in spite of advice, it has been undertaken, the case should be carefully watched, particular attention being paid to œdema of the lungs. If crepitations become persistent after coughing or deep breathing, the advisability of inducing premature labour should be considered. If the percussion note of the lungs becomes impaired, interference is called for."

The last stages of mitral stenosis are commonly characterized by the supervention of auricular fibrillation. This is to be looked on as an absolute bar to pregnancy. If the patient with mitral stenosis and auricular fibrillation has become pregnant, the appearance of œdema of the lungs, orthopnœa, or enlargement of the liver indicates prompt termination of the pregnancy. The use of **Digitalis** in adequate doses will, however, stave off this catastrophe in some cases. The aim should be to reduce the pulse-rate to 70 per minute, and keep it there.

" In cases of aortic regurgitation, if the heart is normal in size and the response to effort is good, pregnancy may be undertaken. If, on the other hand, the ventricle is much hypertrophied, and there is a marked 'Corrigan' pulse, the probability is that the heart will be so permanently impaired that it will cripple the patient severely if she gets over her confinement."

Apart from the use of digitalis in patients with auricular fibrillation, drug treatment is of little service. Mackenzie's remarks on the general management of pregnancy in patients with heart disease are of so much practical value that they must be quoted freely.

" The first duty of the physician is to decide whether or not there is any reason to expect heart failure if pregnancy occurs. If the *functional efficiency* is not impaired to an extent greater than that occurring in a normal pregnancy, no steps need be taken and no anxiety felt. When, however, a woman with undoubted heart disease, such as mitral stenosis, does become pregnant, the pregnancy should be allowed to continue only so long as no marked signs of heart failure are present. Such exercise as can be undertaken in perfect comfort may be permitted. But any distress, particularly breathlessness, is an indication that effort must cease.

" The patient should be examined weekly for signs of heart failure, particularly for signs of œdema of the lungs. If crepitations at the bases of the lungs appear, persist, and tend to increase, they may be taken as evidences of the onset of heart failure. There will also, in such cases, be present a great limitation of the field of response to effort—breathlessness being induced on slight exertion. The patient should be confined to bed or couch, and her activities reduced to a minimum. She should be encouraged to sit up or lie propped up in bed, because lying down, by restraining the movements of the ribs, tends to hamper the circulation in the bases of the lungs. At times, during the day, she should be made to breathe deeply, in order to assist the right heart in expediting the flow through the lungs.

" If heart failure is kept in check, the pregnancy can be allowed to go to full time. It often happens that labour sets in, in these cases, about the seventh month ; so that, as a rule, the birth is accomplished with little stress on the heart. Chloroform should be given at an early stage of labour—light anæsthesia at first—to restrain the 'bearing down', which taxes the heart heavily.

When the labour has advanced so far as to justify the use of forceps, the chloroform should be pushed to complete anæsthesia and delivery accomplished.

"When the heart failure is so extreme as to threaten life, intervention is necessary. Premature labour or miscarriage should then be induced.

"Those patients in whom I induced miscarriage in the third or fifth month suffered from mitral stenosis. I had attended them in previous confinements which they had come through with difficulty—the heart failure being so extreme that it was manifest that another pregnancy would probably prove fatal. In nearly all my cases of mitral stenosis which carried to the later months, premature labour set in spontaneously."

Reference.—[1] *Lancet*, 1921, i, 1163, 1230, 1281, and 1342.

HERNIA OF THE BLADDER. (*See* Bladder.)

HERNIA, DIAPHRAGMATIC. *E. Wyllys Andrews, A.M., M.D., F.A.C.S.*

The progress in the study of this condition has been rapid in the last few years. The large number of traumatic cases seen during the war has taught us so much about the symptoms, and the more frequent use of the *x* rays in all gastro-intestinal conditions has become so general, that the diagnosis is usually arrived at before operation. Three cases were reported as diagnosed this year. Hitherto nearly all the cases have been discovered accidentally at operation.

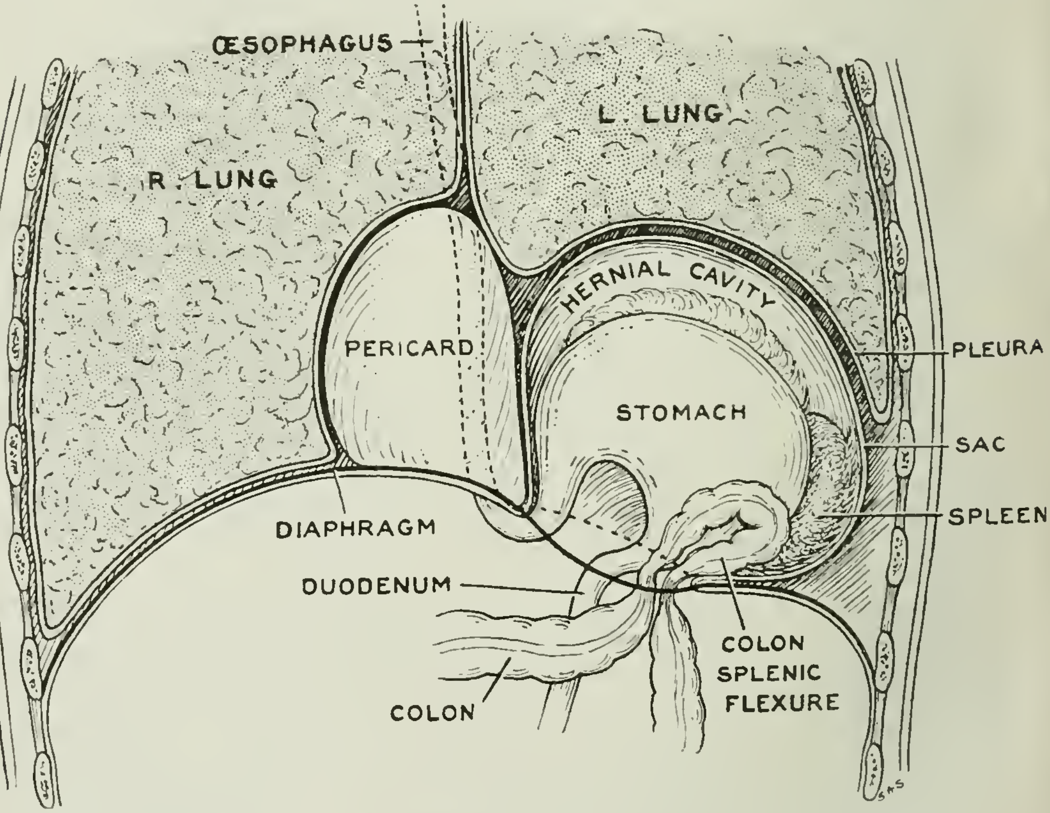
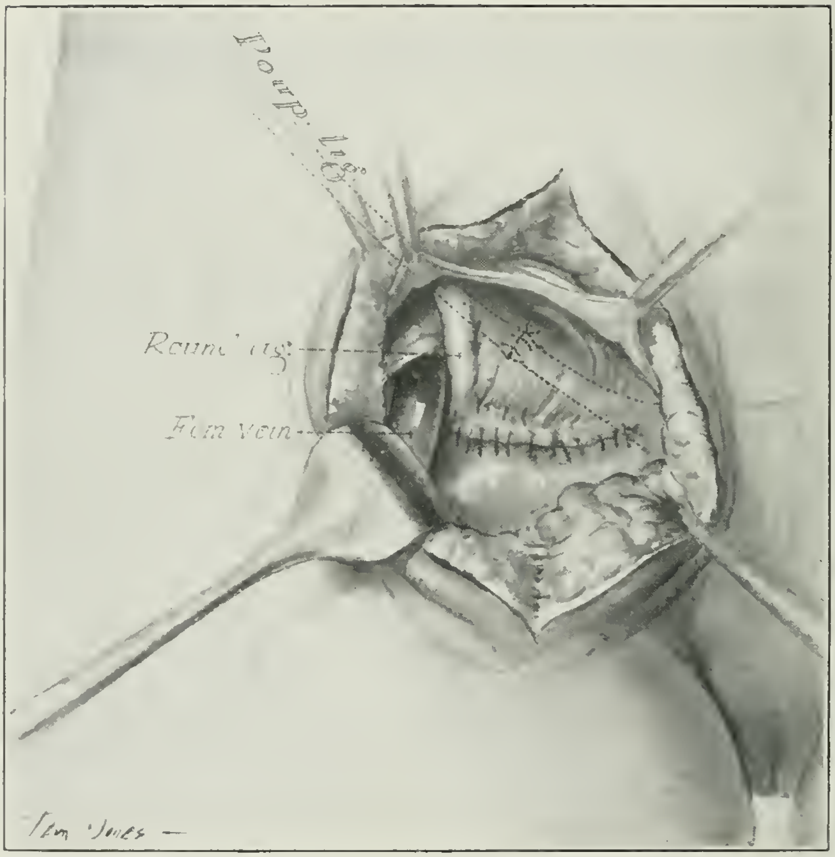


Fig. 45.—Diaphragmatic hernia. (*By kind permission of 'Guy's Hospital Reports'.*)

The most interesting problem is the question of the point of approach to the hernia. It is becoming increasingly evident that the thoracic route is the best. In the only cases reported this year inwhich the other (abdominal) route was chosen, the operator, Mathews,[1] experienced great difficulty, and was

PLATE XIII.

FEMORAL HERNIA.



Skillern's method of repair of large femoral hernia when it is necessary to divide Poupart's ligament. Note suture of free border of round ligament of uterus with still-attached cremaster muscle and fascia to pectineus fascia.

By kind permission of the 'Journal of the American Medical Association'.

unable completely to close the opening in the diaphragm. In lieu of this he anchored the stomach firmly to the anterior abdominal wall to prevent it re-entering the sac.

Rowlands[2] and Bakes[3] report cases successfully operated by the thoracic route. A long incision in the eighth interspace on the left side seems best. With wide Tuffier retractors adequate exposure can usually be obtained without cutting any ribs. The advantages of this method are that the sac is in plain sight, and it is much easier to loosen any adhesions and to remove the sac if any exist. Also the pressure is very much less after the chest is thus open, and reduction is accomplished with less force. The opening in the diaphragm is much more accessible, and it is nearly always possible to make a complete closure. A possible disadvantage is that the abdomen cannot be explored, but in the great majority of cases this is not necessary. Lastly, the phrenic nerve may be found and blocked, thus rendering the movements of the diaphragm almost nil.

The physical findings in cases are well described by Gitlow and Breakstone[4]. They are essentially a collapsed upper abdomen, displacement of the heart to the right, and the normal area of cardiac dullness is occupied by the hernia. This may be dull or tympanitic according to its contents, and the variation of the percussion note in this region from time to time is very characteristic. The point of exit is almost always a dilated œsophageal opening, and the stomach is usually the first organ herniated. The spleen, colon, omentum, or a lobe of the liver may also protrude, but other viscera are usually dragged out by the stomach. The accompanying diagram (*Fig.* 45) from Rowlands' article represents the most typical arrangement.

REFERENCES.—[1] *Arch. Internal Med.* 1920, Dec., 668; [2] *Guy's Hosp. Rep.* 1921, Jan., 91; [3] *Centralb. f. Chir.* 1921, April 23, 554; [4] *Ann. of Surg.* 1921, April, 417.

HERNIA, FEMORAL.

E. Wyllys Andrews, A.M., M.D., F.A.C.S.

Skillern[1] and Indelli[2] have each described a new method of closing the femoral canal from within, which appears to have many advantages. It consists of the use of the round ligament of the uterus. In the case reported by Skillern it had been necessary to divide the inguinal ligament in order to reduce the hernia. After this is done it is almost impossible to sew the ends together again. They are retracted and fine, and the fibres are longitudinal so that stitches will not hold. The round ligament, however, lies in the inguinal canal close to the field, and has also a covering of cremaster muscle that should be preserved, as it adds bulk and strength. This is isolated and sewn on to the pectineus fascia, going well down the thigh and out close to the retracted femoral vein. After this is accomplished the divided ends of Poupart's ligament are sewn together and on to the round ligament behind, and a firm plug is thus made for the femoral canal as well as considerable reinforcement for the weakened ligament (*Plate XIII*). Indelli's method was similar, but he reinforced the whole by a stitch or two in the ligament of Cooper.

REFERENCES.—[1] *Jour. Amer. Med. Assoc.* 1921, Feb. 12, 445; [2] *Policlinico*, 1921, April, 140.

HERNIA, INGUINAL.

E. Wyllys Andrews, A.M., M.D., F.A.C.S.

Recurrence.—Our attention is constantly being drawn to the fact that the results of our herniotomies leave much to be desired. Series of end-results of the best clinics almost invariably give a percentage of recurrences which seems astonishingly high. These statistics are so difficult to collect that the average surgeon has no idea how many of his cases recur; if he had, the operation would not be regarded so lightly. Strangely, the observations as to recurrences after the various types of operations do not agree. For instance, in a study by Gardenal,[1] we are told that 8 per cent recurred after Bassini operations, 34·5 per cent of those done according to the Lucas-Championnière method, and but 1·3 per cent after the Kocher operation. These findings are surely contrary to the experience of most of us. On one thing, however, all agree that from 6 to 10 per cent of all the operations on oblique hernias are failures. The reasons for this are difficult to determine. Infection of the wound, so often assigned such an important rôle, is nowadays a rarity, and cannot account for more than a small percentage. The reviewer would divide them into two classes: (1) The first and smallest class is those due to incomplete removal of the sac. These occur suddenly and without pain very soon after the operation. The new hernia is oblique, and in view of modern knowledge of the etiology of hernia this is the only thing that will explain a true oblique recurrence. Many sacs are double, and one may be entirely overlooked. (2) The other class is due to a deficiency of the conjoined tendon. The recurrence is direct. It appears at the medial end of the canal. Deficiency of the conjoined tendon in the lower portion is at the source of our trouble. The problem is much like that of the direct hernia. The internal oblique muscle, instead of being inserted into the pubis or the rectus sheath near the pubis, is attached an inch or more up, and therefore cannot be sewn down to Poupart's ligament except under undue tension. In a large class of these hernias operation is contra-indicated, as we are beginning to realize in the direct type. The mouth of the sac is wide, strangulation is unlikely, and the results are necessarily poor. If operation is undertaken, patients should be given the benefit of every possible method of strengthening this weak spot. The rectus should always be used after opening its sheath, and the cord always sewn in front so as not to destroy the obliquity of the canal.

Foldes[2] has discussed this matter in an admirable paper, from which the accompanying illustration (*Fig.* 46) is taken.

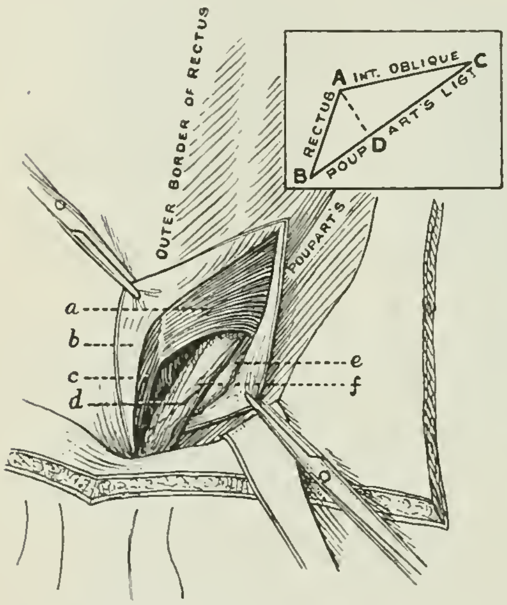


Fig. 46.—Relation of muscles in the inguinal region.

The length of AB, as measured in 100 cases, was: In 1 case, no centimetres; in 7 cases, 1 cm.; in 31 cases, 2 cm.; in 28 cases, 3 cm.; in 17 cases, 4 cm.; in 9 cases, 5 cm.; in 5 cases, 6 cm.; in 2 cases, 7 cm. He insists on the following important points in technique:

1. The inclusion of Gimbernat's ligament in the lowest corner. The needle must be felt against the bone.

2. The inclusion of the edge of Poupart's ligament in the suture as well as its middle part.

3. As Poupart's ligament tears easily, when inserting the needle into the ligament the needle should be passed so as to follow the curve of the needle, not making a sideward excursion with it.

4. When tied, the muscle must always be drawn to Poupart's ligament instead of drawing Poupart's ligament up to the muscles. This is accom-

plished through mobility of the muscles and the correct placing of the sutures. If Poupart's ligament is drawn up to the muscle, it might give rise to the formation of a hernia below.

The object aimed at is to build the posterior wall of the canal. This is accomplished by uniting in one line the inguinal triangle formed by the rectus, the true border of the internal oblique, and Poupart's ligament. As a rule four single sutures are sufficient. The wall should be examined for any defect, and sutures placed where needed.

Taylor,[3] in an exhaustive study of the end-results at Johns Hopkins Hospital, has noted that in cases where the conjoined tendon was noticed to be weak, 37·5 per cent recurred. The tendency of excision of the veins to cause hydrocele is well shown, as 20 per cent developed hydrocele where this was done, against 3·8 per cent where this step was omitted. Of the oblique hernias, about 7 per cent had recurred, and over a fourth of the direct. Of 19 cases where the cord was transplanted, 7 recurred.

Lyle[4] regards the *position of the patient* during and after the operation as very important. He uses the ordinary dorsal position for the first stage of the operation. This includes the dissection and removal of the sac. Then the knees are partially flexed on the body and the back also is slightly flexed. This relaxes the oblique muscles and enables one to sew them to Poupart's ligament with much less tension than is ordinarily encountered. Mainly the distance from the conjoined tendon to the ligament is lessened. This reduction varies from 20 to 70 per cent, the average being about 35 per cent. On the completion of the operation the patient is put to bed in the same position.

Some very interesting experimental work has been done by Bolognesi[5] on the *mechanism of strangulation.* He created large defects in the abdominal wall of dogs, and then pulled out a loop of intestine which was inserted into an artificial hernial sac made of rubber. The appearance of strangulation did not seem to be dependent so much on the size of the ring as on its elasticity. Where the ring was rigid, no strangulation took place. On the contrary, in dogs where the ring was elastic, strangulation took place promptly in all cases. The degree of injury to the bowel in these cases was not dependent on the duration of the strangulation.

Risley[6] and Criley[7] each report a series of cases of *sliding hernia.* The former used Wier's flap method in several of his cases in order to cover up the colon and build a mesentery for it; he had to modify it, however, to suit each individual case. The latter did not find it applicable, and simply dissected the colon loose and pushed it back into the abdomen and then removed as much of the sac as possible. [This latter corresponds with the reviewer's experience.—E. W. A.]

REFERENCES.—[1]*Med. Ibera,* 1919; [2]*Surg. Gynecol. and Obst.* 1920, Oct.; [3]*Arch. of Surg.* 1920, i, 382; [4]*Surg. Gynecol. and Obst.* 1920, Nov.; [5]*Arch. de Méd. exper. et d'Anat. path.* 1919, xxviii, 403; [6]*Boston Med. and Surg. Jour.* 1921, Jan. 6; [7]*Surg. Gynecol. and Obst.* 1920, Dec.

HERPES ZOSTER.

E. Graham Little, M.D., F.R.C.P.

Arnstein[1] adduces some evidence for the association of herpes zoster with disease of internal organs, and urges careful examination in all cases of herpes zoster for affections especially of the liver and lung, which in his experience are the commoner associations. In most of the instances he quotes, there was no other symptom pointing to visceral disease until careful examination was made. It is of particular interest to note that in 1 out of the 8 cases he describes in detail, generalized herpes developed on the sixth day of an eruption which had begun as a typical herpes involving the 4th and 5th left dorsal; in this case the left lung was affected with a basal pneumonia.

Ramond and Lebel[2] draw attention to a clinical sign associated with herpes zoster which is of much diagnostic importance. They found that there was constantly a primary adenitis of the glands into which the lymphatics of the affected area drained. Like the eruption, the adenitis is unilateral, it appears quite early even in the mildest cases, and is seldom painful ; hence it is often overlooked. The adenitis is at its height when the vesicles appear, and disappears about the seventh day. The later adenitis, the result as a rule of suppuration in the site of the herpes eruption, is carefully to be distinguished from this primary type.

REFERENCES.—[1] *Wien. klin. Woch.* 1921, Jan. 13, 13 ; [2] *Lancet*, 1920, ii, 70 (abstr.) ; [3] *Wien. klin. Woch.* 1921, Jan. 13, 13.

HETERÆSTHESIA. (*See* SPINE AND SPINAL CORD.)

HICCOUGH, EPIDEMIC.

J. Ramsay Hunt, M.D.

Singultus as a manifestation of encephalitis lethargica is the subject of an interesting review by Lhermitte.[1] He refers to the 'febrile hiccough' and 'fièvre singultueuse' of the ancients, and the small place these observations have had in modern symptomatology. It was only in the winter of 1919–20 that von Economo reported a small epidemic of hiccough in Vienna and its environs. Numerous individuals were suddenly attacked, the symptoms lasting for hours or days uninfluenced by any treatment, and finally ceasing spontaneously. Later this symptom appeared in association with cases of encephalitis of the myoclonic type. Subsequently Dufour reported a small epidemic of 11 cases in Paris. One of the cases terminated in myoclonus with delirium. At the same time Bénard pointed out the existence of an epidemic near Versailles. He regarded the symptoms as a larval form of encephalitis lethargica. Stoehelin reached similar conclusions after observing a small epidemic of transient ocular palsies followed by an epidemic of hiccough. Similar groups of cases were also reported by Logre and Heuyer, Sicard and Paraf, and Netter.

F. M. R. Walshe[2] summarizes the symptomatology as follows : There may be a short prodromal period of several days during which the patient complains of lassitude, generalized pains, headache, and epigastric discomfort. There may be slight fever during this period. Hiccough then appears, and persists in short attacks of from fifteen to thirty minutes about every half hour for three or four days. On the other hand, it may come on suddenly in an individual in apparently perfect health. While it lasts there is slight fever. Usually the pulse-rate is normal, though some cases are recorded in which there was tachycardia. The cerebrospinal fluid is normal, and there are no other objective manifestations of the disease of any kind. The attack passes off as suddenly as it begins, but while it lasts no artifice seems of value in stopping the hiccough. Rivert, however, mentions that it may be controlled by pressure upon the globes of the eyes. Relapses are not seen, and the vast majority of cases are males.

Netter and Vincent, discussing the possibility that suggestion may be in part responsible for the widespread incidence of this syndrome, conclude that the inclusion of the sternomastoids and scalene muscles in the spasm, the grunting character of the sound (in distinction from the loud bark of hysteric hiccough), and the frequent unilateral character of the diaphragmatic contraction, exclude hysteria as being in any important degree concerned ; while, in addition, cases of clonic spasm of the diaphragm without hiccough also point to this conclusion.

TREATMENT.—According to Lhermitte the method of treatment is limited to an attempt to control the phrenoglottic contractions, and here only superficial remedies are available. These may be divided into two groups: (1) Medicaments directed towards reducing the hyperexcitability of the bulbospinal and vagophrenic regions; among these are belladonna, atropine, cocaine, morphine, bromide, camphor, and oxygen. (2) Physical remedies directed toward reducing the reflex excitability of the parts; among these are compression of the vertebral column; of the ulnar nerve; of the eyeballs; distention of the œsophagus or stomach; direct compression of the phrenic through the scalene muscles, or its faradization; and traction of the tongue.

REFERENCES.—[1]*Presse méd.* 1920, 916; [2]*Med. Science*, 1921, 481.

HIP, CONGENITAL DISLOCATION OF. (*See* ORTHOPÆDIC SURGERY.)

HIRSCHSPRUNG'S DISEASE. (*See also* COLON, SURGERY OF.)

Frederick Langmead, M.D., F.R.C.P.

J. Popper[1] rightly points out that true congenital megalocolon as described by Hirschsprung is a very rare malady, and that many of the reports and studies on the subject concern another condition which is probably acquired. Hirschsprung's disease is characterized by symptoms and signs dating from birth or soon after, such as obstinate constipation, marked distention, active and visible peristalsis, and, finally, symptoms of toxæmia. It is usually fatal in a short time. The other form, much more commonly met with, begins later in infancy or in early childhood, and causes abdominal enlargement and severe constipation with its associated symptoms, is acquired, and probably results from obstruction by spasm. He records two examples of the true Hirschsprung's disease in twins.

REFERENCE.—[1]*N.Y. Med. Jour.* 1920, Dec. 25, 1030.

HODGKIN'S DISEASE.

E. Graham Little, M.D., F.R.C.P.

Howard Fox[1] comments on the different types of skin eruption seen in association with Hodgkin's disease, and divides these into two classes: (1) a very mixed group of prurigo-like eruptions which are in no sense distinctive; and (2) much less commonly, an eruption of tumours which have a characteristic histological structure, the most typical detail of which is the presence of uninuclear and multinuclear giant cells, generally known as Sternberg-Reed bodies. Reed's description of these cells is quoted, and may thus be summarized: They vary from the size of two or three red blood-corpuscles to cells twenty times this size. They usually lie free in the interstices of the tissues, but are occasionally seen in the reticulum and with irregular protoplasmic processes. The nucleus is usually large in proportion to the size of the cell. It may be single or multiple. If single, it is usually round. Bean-shaped and irregularly indented nuclei are common. If multiple, the nuclei may be arranged peripherally in the cell or heaped in the centre. Eight or ten have been seen in a single cell. The chromatin network is prominent in these nuclei, and one or more large nuclei are always present. The nucleoli always take a contrasting stain to the nucleus. No definite mitotic forms were ever seen. Direct division was frequently observed. The protoplasm is usually homogeneous and stains well. These giant cells, so far as the author's observation reaches, are peculiar to this growth and are of great assistance in diagnosis.

Fox records a case of a man, age 30, with this rarer eruption, who showed a painless, rather slight, enlargement of most of the palpable lymphatic glands, a well-marked enlargement of the spleen, a mild anæmia, but otherwise normal blood-picture; occasional fever, dyspnœa, and asthma; and an eruption consisting of painless lumpy infiltrations, of a purplish colour, varying in size from two inches to quite small nodules, and distributed on the scalp and temples, and interscapular region. Sections from one of the tumours showed the changes characteristic of the disease as described above. *X*-ray treatment was given, with results which are not mentioned.

REFERENCE.—[1]*Arch. of. Dermatol. and Syph.* 1920, Nov., 578.

HOOKWORM DISEASE. (*See* ANKYLOSTOMIASIS.)

HOUR-GLASS STOMACH. (*See* STOMACH, HOUR-GLASS.)

HYDROCEPHALUS. (*See also* CEREBROSPINAL FEVER.)

J. Ramsay Hunt, M.D.

Cause of 'Communicating' Hydrocephalus.—The cause of so-called idiopathic hydrocephalus has been investigated by W. E. Dandy.[1] Until recently all cases of hydrocephalus were considered idiopathic. It is now fair to assume that those cases in which an obstruction in the ventricular system can be demonstrated may be liberated from this *terra incognita* and may be classified according to an established pathology. Any lesion which occludes the ventricular system will always produce stasis of fluid and dilatation of the ventricles proximal to the obstruction, but will not change the size of the ventricles distal to it. There can be no exception to this rule. The purpose of this paper is to present proof of the cause of the remaining big group of this disease—communicating hydrocephalus, i.e., that type of hydrocephalus in which all the ventricles are in communication with the subarachnoid space. In the course of intensive studies on the absorption of cerebrospinal fluid in hydrocephalus, it was found that in the communicating type the *absorption from the subarachnoid space was greatly reduced.* In four cases of communicating hydrocephalus adhesions were found which obliterated the cisternæ; hence it was assumed that, by preventing the cerebrospinal fluid from reaching the great absorbing spaces over the cerebral hemispheres, these adhesions had caused the hydrocephalus.

Communicating Hydrocephalus Experimentally Produced.—Dandy has produced communicating hydrocephalus in dogs by making a barrier of adhesions in the mesencephalic cisterna. Shortly before necropsy on these animals a suspension of India ink was substituted for an equal amount of cerebrospinal fluid which had been aspirated from the cisterna magna through a puncture of the occipito-atlantal membrane. When India ink is introduced into the spinal canal of an animal whose cerebrospinal spaces are intact, the colour will find its way within two hours to every point of the subarachnoid space over both cerebral hemispheres. But in the experimental animal with the perimesencephalic band of adhesions, the passage of the ink is abruptly terminated by the obstructing band and none of the colour reaches the surface of either cerebral hemisphere.

Demonstration of Obstruction in the Subarachnoid Space at Post-mortem Examination.—The graphic colour method should be applied to all human necropsy material in which hydrocephalus is suspected or known to be present. It is important that pressure be avoided in introducing these coloured solutions, for delicate adhesions, though sufficient to cause an obstruction during life, may be easily ruptured, and in this way artificial results may be obtained.

Despite studies in a large series of cases of hydrocephalus, the writer had but one opportunity of applying this method at a post-mortem examination in a case of hydrocephalus with communication. In this instance the results were just as striking as in the experimental cases which have been described; the colour filled the cisternæ, even the cisterna interpeduncularis, and covered the cerebellar subarachnoid spaces, but failed to reach any of the sulci over either cerebral hemisphere.

Why should an Obstruction in the Cisternæ cause Hydrocephalus?—The cerebrospinal fluid circulates in a mesothelial-lined vascular system which is just as definite as the vascular systems for blood, lymph, or bile. The cavities in the interior of the brain (the ventricular system) are concerned only with the production of cerebrospinal fluid; the spaces on the exterior of the brain (the subarachnoid spaces) are normally concerned only with the absorption of cerebrospinal fluid. The balance between the production and absorption of fluid is maintained by three closely-grouped communicating openings—the foramina of Luschka and that of Magendie. Only through these openings can fluid escape from the entire ventricular system; consequently, closure of these openings always produces a stasis of fluid—hydrocephalus—in all the ventricles. But in communicating hydrocephalus these conduits are open, either entirely or in part, depending upon the extent and position of the pathological lesion. This type of hydrocephalus is caused by interference with the absorption of the cerebrospinal fluid in the subarachnoid spaces. The real absorbing area of the subarachnoid space is the great network of the subarachnoid spaces over the cerebral hemispheres—the cerebral sulci. Here the cerebrospinal fluid is distributed over a very extensive surface of blood capillaries of the pia, and passes directly through the capillary walls into the blood by osmosis. Numerous large branches convey the fluid to these spaces from the cisterna chiasmatis and the cisterna interpeduncularis, which together serve as a distributing centre for all the cerebrospinal fluid which is destined to reach the cerebral hemisphere. Since all the ventricular fluid, on leaving the ventricles, first reaches the cisterna magna by way of the foramina of Luschka and Magendie, a relatively long passage-way under the medulla, pons, and mid-brain must be traversed before this fluid can reach the cisterna interpeduncularis and the cisterna chiasmatis, whence it can be distributed to the cerebral sulci by the major branches, as described.

By experimental methods, it has been shown that from three-fourths to four-fifths of the cerebrospinal fluid is absorbed from the subarachnoid spaces of the brain, and the remaining one-quarter or one-fifth in the spinal subarachnoid space. It is doubtful if any absorption occurs in the cisternæ, these channels probably serving only as large conduits to carry the fluid to the surface of the brain, much as the ureters carry the urinary secretion to the bladder.

Intra-vitam Method of Demonstrating an Obstruction in the Subarachnoid Space.—The value of intraspinous injections of air will be apparent when it is realized that every part of the subarachnoid space can be reproduced in a röntgenogram, just as every part of the ventricular system can be reproduced by an intraventricular injection of air (*Fig.* 47). At times the ventricles also can be injected from the spinal puncture, and again the subarachnoid space may be partially or wholly injected by way of the ventricular puncture. The patient is placed in the recumbent position, with the head exactly horizontal, and higher than the body. This position must be carefully maintained until the skiagram has been taken. In the normal adult, about 30 to 60 c.c. of fluid can be obtained by lumbar puncture, and an equal quantity of air which is substituted will fill all parts of the subarachnoid space. The cerebral sulci are shown as a network of lines over the brain (*Plate XIV*). The presence or absence of these air-filled sulci is the crucial observation of all intraspinous injections. Intact subarachnoid spaces may be interpreted to mean that hydrocephalus, if present, cannot be of the communicating type; if, therefore, hydrocephalus is present (with air-filled sulci), an obstruction must be located in the ventricular system. On the other hand, the absence of air in the cerebral sulci means that an obstruction exists in some part of the subarachnoid space; it also indicates that hydrocephalus must exist because the cerebrospinal fluid (air) cannot reach the absorbing spaces of the cerebral hemispheres; the hydrocephalus with such pneumographic findings would be of the communicating type, or possibly of an obstructive type, which, if corrected, would only be transferred into a communicating type.

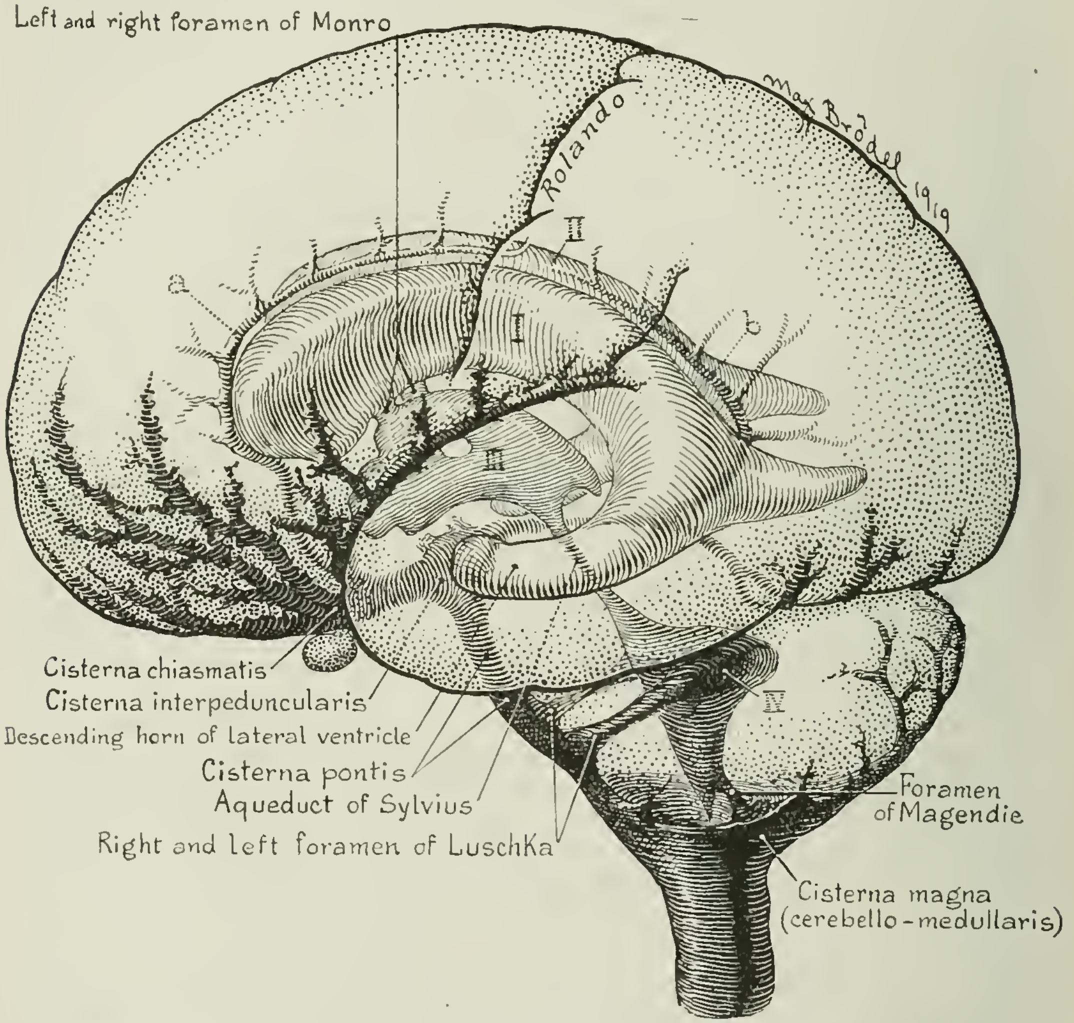
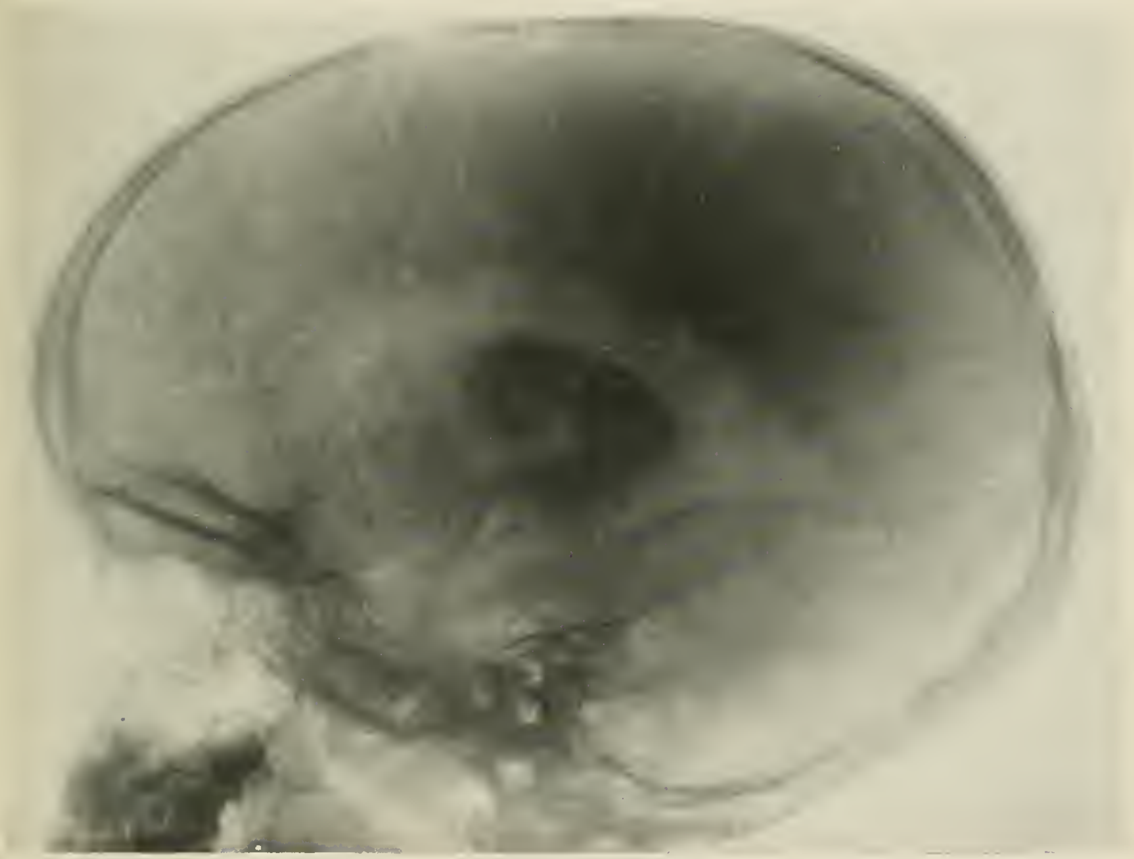

Left and right foramen of Monro
Rolando
Max Brödel 1919
a
b
I
II
III
IV
Cisterna chiasmatis
Cisterna interpeduncularis
Descending horn of lateral ventricle
Cisterna pontis
Aqueduct of Sylvius
Right and left foramen of Luschka
Foramen of Magendie
Cisterna magna (cerebello-medullaris)

Fig. 47.—Drawing by M. Brödel to show the general plan of the vascular system of cerebrospinal fluid. Fluid forms in the cerebral ventricles and is absorbed in the subarachnoid space. The paired foramina of Luschka and the median foramen of Magendie are the only openings by which the ventricular fluid can leave the ventricles and reach the subarachnoid space. Obstructions at these openings, the aqueduct of Sylvius, or the foramen of Monro, produce hydrocephalus involving the ventricles anterior to the obstruction. Obstructions in the subarachnoid space are just as effective in producing hydrocephalus. The sites of these obstructions and their effects will be shown in the succeeding plates. (*The above figure and Plates XIV, XV by kind permission of the 'Johns Hopkins Hospital Bulletin'.*)

Location of Occlusions of the Subarachnoid Space.—Obviously an obstruction can exist at any part of the subarachnoid tree, and the results, in terms of hydrocephalus, will be dependent upon the location of the obstruction. The obstruction may be in the trunk of the tree (the cisternæ); it may occlude all the main branches which carry fluid from the cisternæ to the cerebral sulci; it may occlude some, but not all, of these branches; or finally, more or less extensive local areas of the subarachnoid space may be obliterated.

PLATE XIV.

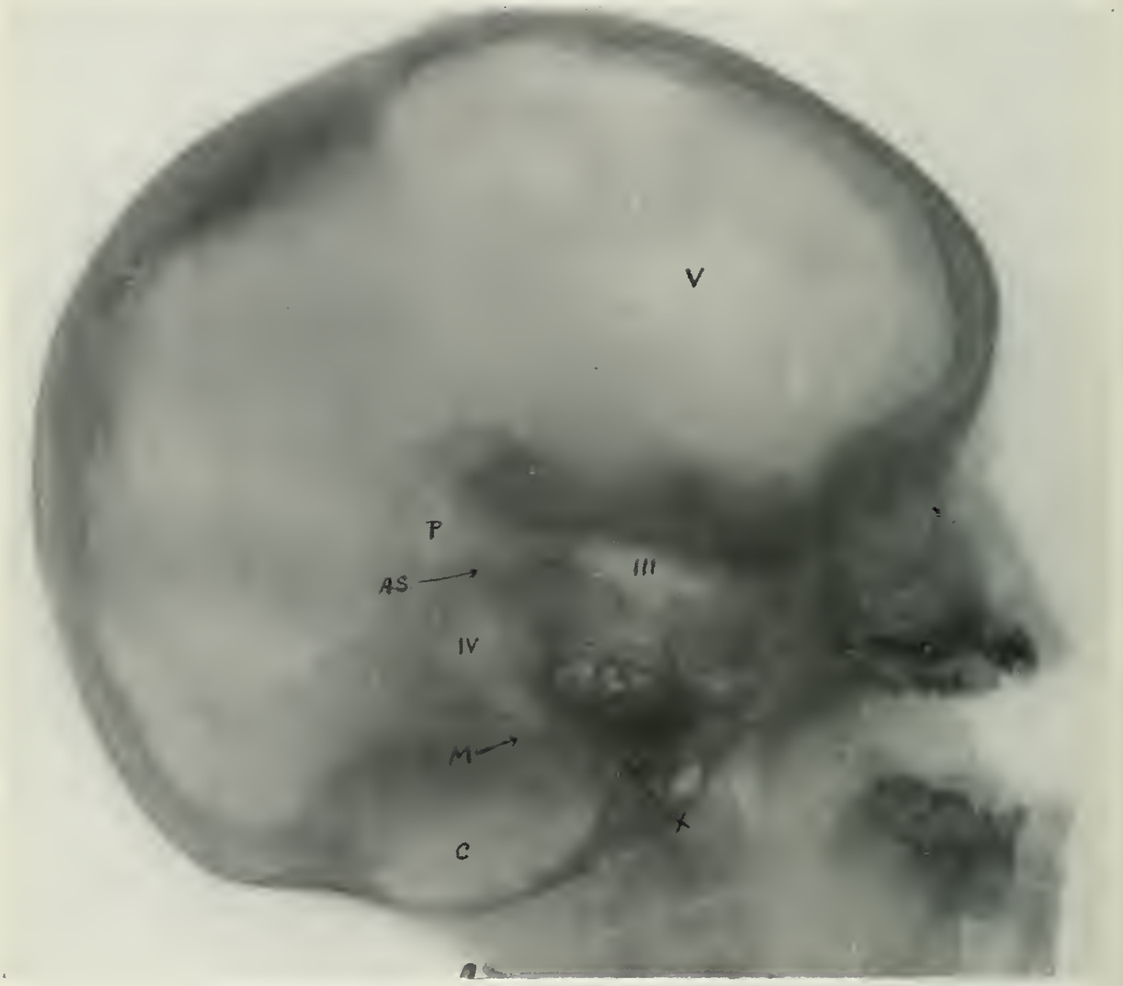
HYDROCEPHALUS—*continued*



Pneumogram (intraventricular injection of air) to show normal ventricle and normal subarachnoid spaces. Note that the cerebral sulci (the wavy lines) are filled over the entire surface of the brain. The cisternæ interpeduncularis and chiasmatica are shown as the distributing centre from which all the cerebral sulci receive their fluid.

PLATE XV.

HYDROCEPHALUS—*continued*



Untouched reproduction of a ventriculogram from a case of communicating hydrocephalus; 800 c.c. of fluid were aspirated and an equal quantity of air substituted. The entire cerebrospinal vascular system is shown in the pneumogram up to the point of obstruction, which is also sharply defined. The tremendous lateral ventricles have lost all semblance of their former shape, and practically fill the huge cranial chamber. The third ventricle, the aqueduct of Sylvius, and the fourth ventricle are outlined sharply. The foramen of Magendie can be seen; the large cisterna magna fills much of the posterior cranial fossa. The obstruction which is causing the hydrocephalus is at the anterior terminus of the shadow of the cisterna magna. The obstruction, therefore, is in the cisterna pontis; no air has reached the cerebral sulci. The hydrocephalus in this case followed an attack of epidemic meningitis.

V, Lateral ventricle. III, Third ventricle. IV, Fourth ventricle. P, Suprapineal recess of third ventricle. AS, Aqueduct of Sylvius. M, Foramen of Magendie. C, Cisterna magna. X, Obstruction in pontine cisterna: this obstruction causes the hydrocephalus.

Obstruction in the Cisternæ.—The most frequent location for an obstruction in communicating hydrocephalus is in the cisternæ. The vast majority of all cases of communicating hydrocephalus follow meningitis. At times the meningitic process may be of pre-natal origin. This is shown by the frequent occurrence of this type of hydrocephalus at birth and by the presence of the basilar adhesions as the etiological factor, also by the co-existence of a meningocele which is doubtless caused by the same general process. Communicating hydrocephalus can, of course, result from obstruction of the cisternæ by tumours of the pons and mid-brain, and even by tumours situated in the middle cranial fossa.

In 7 out of 10 patients with communicating hydrocephalus studied by cerebral pneumography, the obstruction has been located in the pontine or mesencephalic cisterna. In each of these, the column of air ended abruptly under the pons or mid-brain and no air reached the cerebral sulci ; in each, the air passed freely into the lateral ventricles, demonstrating the free communication between the ventricles and the spinal subarachnoid space ; in each, the cisterna magna was also seen, but its size varied.

Occlusion of all the Main Branches of the Cisterna Interpeduncularis and the Cisterna Chiasmatis.—In certain cases the occlusion was not in the cisternæ but in the large branches which radiate from the cisternæ interpeduncularis and chiasmatica and carry the cerebrospinal fluid to all the surfaces of the cerebral hemispheres (*Plate XV*). Although the anatomical features of these cases differed greatly, fundamentally they were similar in that the cisternæ were patent but all the branches were sealed. In all, the clinical diagnosis of communicating hydrocephalus was established by the phenolsulphonephthalein test. In each the site of the obstruction was determined by cerebral pneumography. These branches may be absent because they have been obliterated by adhesions following meningitis or because they may have failed to develop.

Diagnosis and Treatment of Hydrocephalus due to Occlusion of the Foramina of Magendie and Luschka.—Dandy[2] considers that every case of hydrocephalus has a specific cause which can and should be located by clinical tests during life. In a great many instances this cause is easy of correction by operation, with a resultant cure of the disease. To be effective, the treatment must be applied in the early stages of the disease. In the ventricles cerebrospinal fluid is produced ; in the subarachnoid space it is absorbed. The balance between the formation and the absorption of cerebrospinal fluid is maintained solely by three openings which connect the fourth ventricle with the cisterna magna. These openings are the paired foramina of Luschka and the median foramen of Magendie.

PATHOLOGY.—There are, apparently, two types of occlusions of the foramina of Luschka and Magendie, one which occurs congenitally and is well advanced at birth, the second which occurs at all ages. The latter always follows some form of meningitis ; the former may or may not be the result of an intra-uterine inflammation.

There is a second group of these occlusions of the basal foramina, which occurs in infants, in which an old inflammatory process is everywhere manifest. The base of the brain is then sealed to the dura over areas of considerable extent ; the meninges are thickened and tough, and the contiguous brain itself is usually thickened and rigid. The cisterna magna and the other cisternæ are usually obliterated by adhesions. The foramina of Luschka and Magendie are occluded either completely or almost completely. The floor of the fourth ventricle also shows marked evidences of the inflammation.

To sum up the pathology of 9 cases, the fundamental features were always similar. The foramina of Luschka and Magendie were closed. The absence or presence of the vermis, the position of the cerebellar lobes, the presence or absence of the bulging fourth ventricle between the inferior surface of the cerebellum and the medulla, the presence or absence of a cerebellar hernia into the spinal canal, were all dependent upon local differences in type or extent of the causative lesion, and doubtless also upon the time at which the lesion developed. In 4 cases, the cause of hydrocephalus was presumed to be a failure of the foramina of Magendie and Luschka to develop, though a mild intra-uterine inflammation cannot be excluded. In 2 cases, a definite inflammatory process in infancy caused the condition, and in a third case a definite intra-uterine inflammation had been the cause. Two adult cases were caused by a mild meningitis which, clinically, was not recognized as such, but the pathological findings needed no clinical confirmation.

Diagnosis.—It is first necessary to determine that hydrocephalus is not of the communicating type, but is due to an obstruction in the ventricular system. This is done by the indigo-carmine test. An absolute determination of the precise location of the obstruction can be made only by the use of ventriculography. Following a complete removal of the ventricular fluid and the substitution of air, the latter will reach the point of the obstruction but cannot pass beyond. If the aqueduct of Sylvius is obstructed, the third ventricle will be clearly shown, but no air will reach the fourth ventricle. If, in hydrocephalus, the fourth ventricle and aqueduct of Sylvius are filled with air, both will be enlarged and the boundaries of each will be sharply defined (*Plate XVI*). Such findings will eliminate an obstruction at the aqueduct of Sylvius and place the obstruction at the foramina of Luschka and Magendie, provided, of course, an obstructive hydrocephalus has been demonstrated by the indigo-carmine or phenolsulphonephthalein tests.

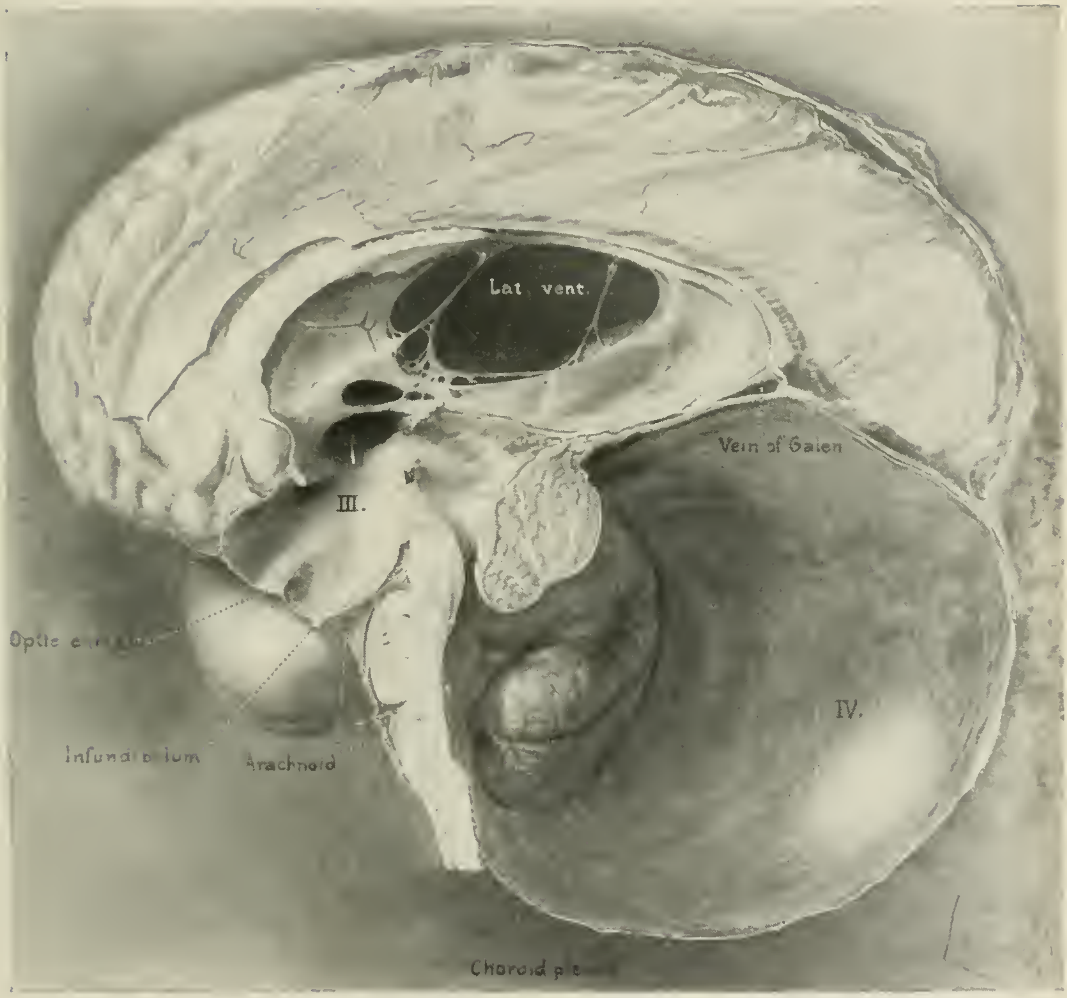
Treatment.—It is obvious that the only satisfactory treatment of any form of hydrocephalus is the treatment of the cause. In occlusions of the foramina of Luschka and Magendie, the entire ventricular system is devoid of any communication with the subarachnoid space, and to cure the hydrocephalus it is necesssary to make one opening between the fourth ventricle and the cisterna magna to assume the function of the three which are blocked. But before operating it is necessary to know whether the ultimate radicles of the subarachnoid space are open, and whether there is a normal absorption of fluid from the subarachnoid space. Following meningitis, particularly in children, the cisternæ are blocked as well as the foramina of Luschka and Magendie, so that the reconstruction of a new foramen of Magendie would lead to no beneficial results, because the ventricular fluid would have access to only the restricted area of the subarachnoid space posterior to the tentorium cerebelli. The subarachnoid space should be tested in one of two ways, by the intraspinous phenolsulphonephthalein test, or by an intraspinous injection of air.

Production of a New Foramen of Magendie at Operation.—The usual bilateral exposure of the cerebellum is made exactly as is done for the extirpation of cerebellar tumours. The operator will quickly learn to recognize the normal foramen of Magendie at a glance and to know whether it is open or closed.

Diagnosis and Treatment of Hydrocephalus resulting from Strictures of the Aqueduct of Sylvius.—Dandy[3] observes that as the anatomy of the cerebrospinal spaces and the circulation of the cerebrospinal fluid becomes more clearly understood, hydrocephalus begins to appear as a single disease with varied anatomical manifestations, which are dependent upon the location of the underlying cause. Hydrocephalus is always secondary to a primary cause, and it should now be possible in every instance to locate the primary lesion, though its discovery, while at times simple, is usually sufficiently difficult to exhaust all the newer methods at our command.

PLATE XVI.

HYDROCEPHALUS—*continued*



The entire ventricular system is dilated, the fourth ventricle particularly so. Had the obstruction been at the aqueduct of Sylvius, the fourth ventricle would not be enlarged.

Plates XVI–XXI by kind permission of
'Surgery, Gynecology, and Obstetrics'

PLATE XVII.

HYDROCEPHALUS—*continued*

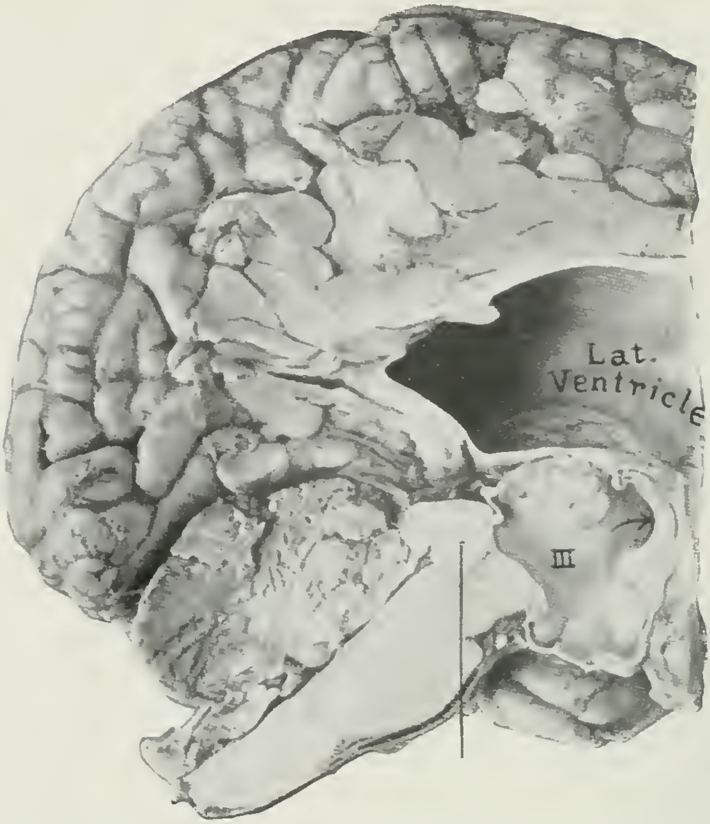


Fig. A.—Sagittal view of brain with hydrocephalus due to complete occlusion of the aqueduct of Sylvius. Note the dilated third and lateral ventricles, which are anterior to the obstruction; and the collapsed fourth ventricle, which is posterior to and therefore unaffected by the obstruction.

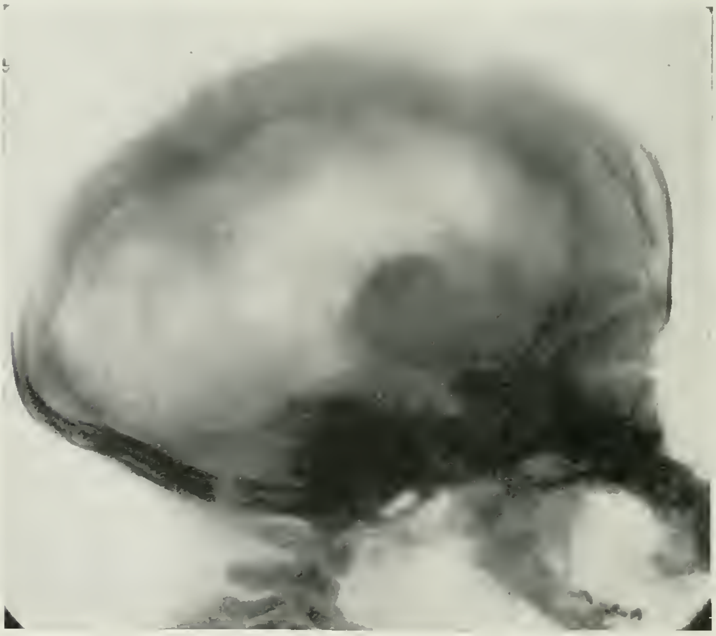
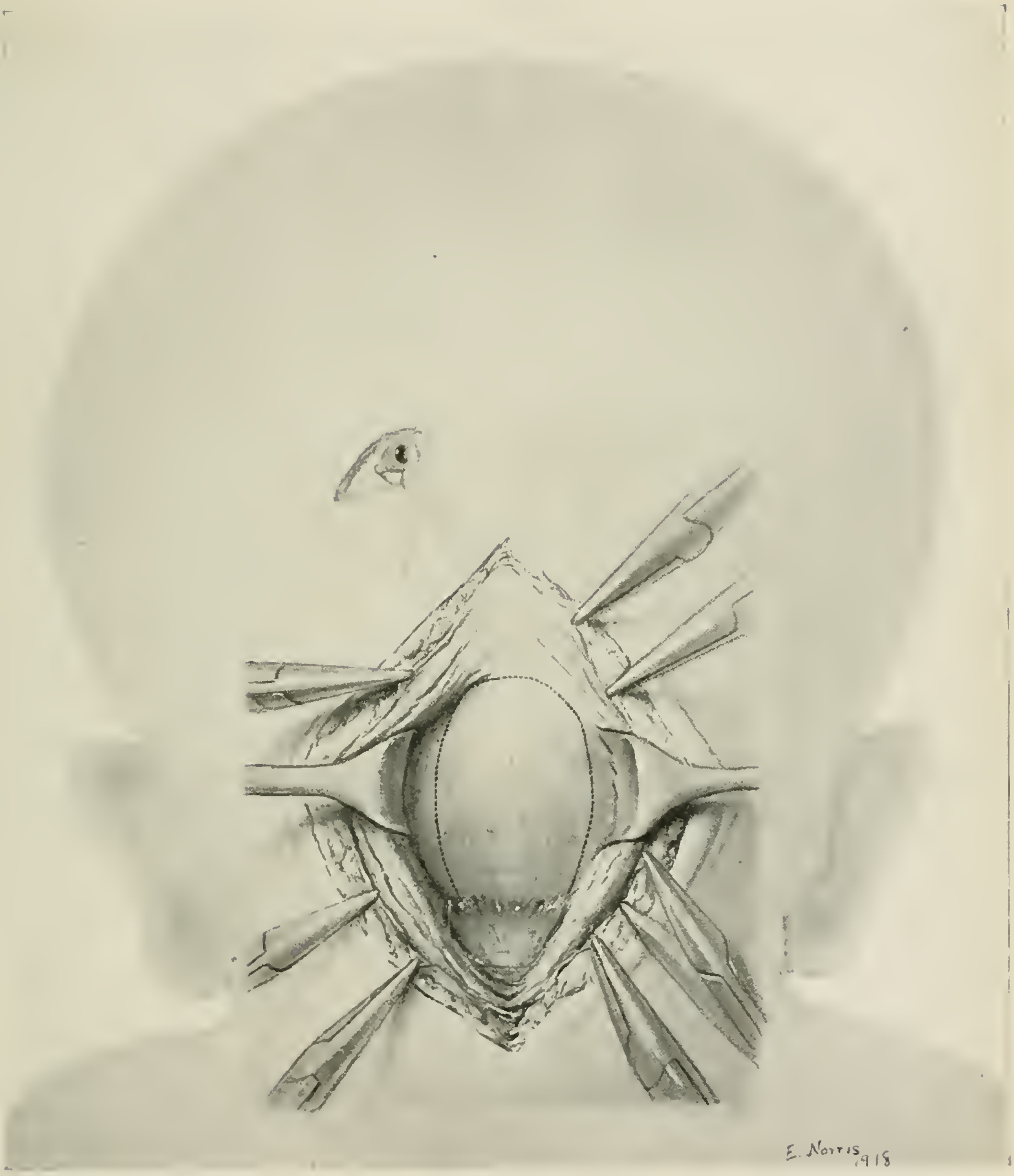


Fig. B.—Ventriculogram from a case of hydrocephalus diagnosed at birth. This shows the third ventricle filled with air, in addition to one lateral ventricle. There is no air in the fourth ventricle. The obstruction is therefore at the aqueduct of Sylvius.

PLATE XVIII.

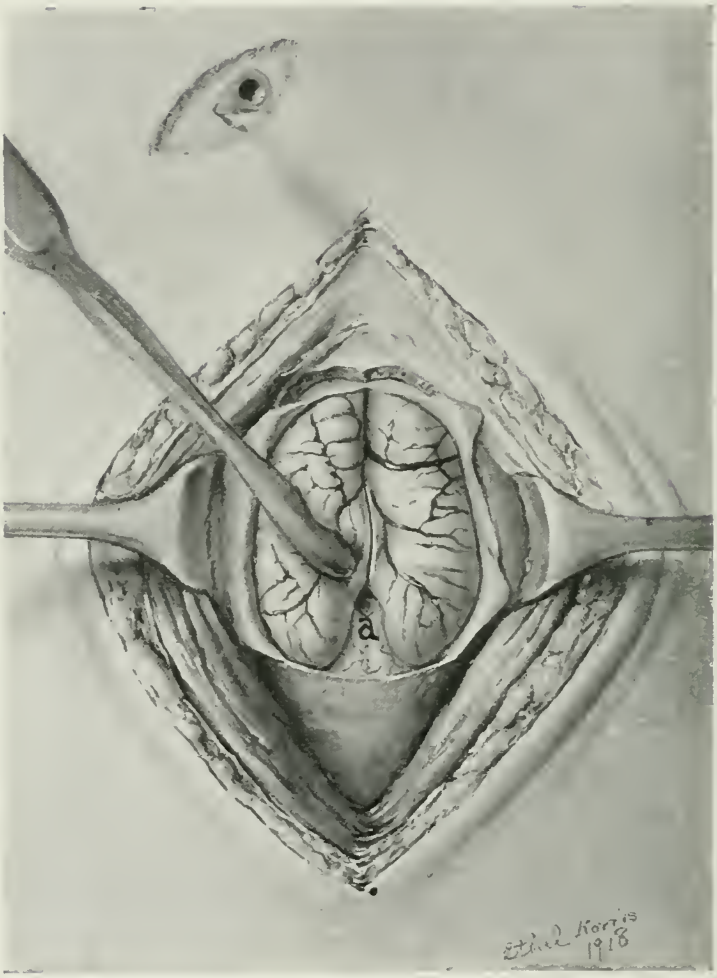
HYDROCEPHALUS—*continued*



Plates XVIII–XXI show the operative procedure by which a stricture of the aqueduct of Sylvius is opened and enlarged and a tube inserted to maintain the opening. In this figure the wound is shown. The occipital muscles are separated in the mid-line and the bone exposed. A ventricular puncture is made to reduce the intracranial pressure.

PLATE XIX.

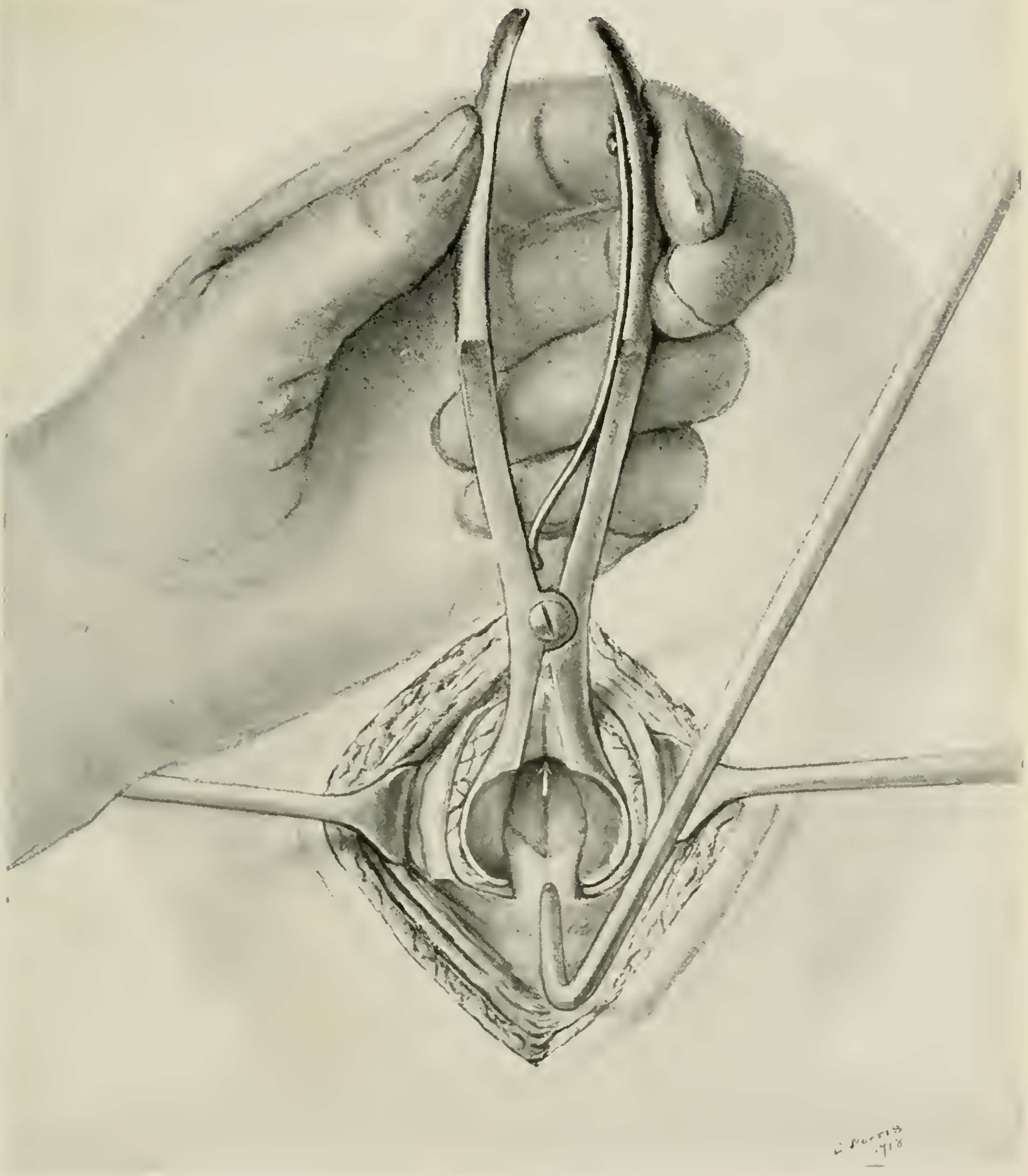
HYDROCEPHALUS—*continued*



The cerebellum is exposed. The cerebellum is lifted and the foramen of Magendie (*a*) exposed. The line in the vermis indicates the site for section of the posterior part of the cerebellum.

PLATE XX.

HYDROCEPHALUS—*continued*



The dilator is separating the divided surfaces of the cerebellum, and exposes the fourth ventricle and the beginning of the aqueduct of Sylvius.

PLATE XXI.

HYDROCEPHALUS—*continued*

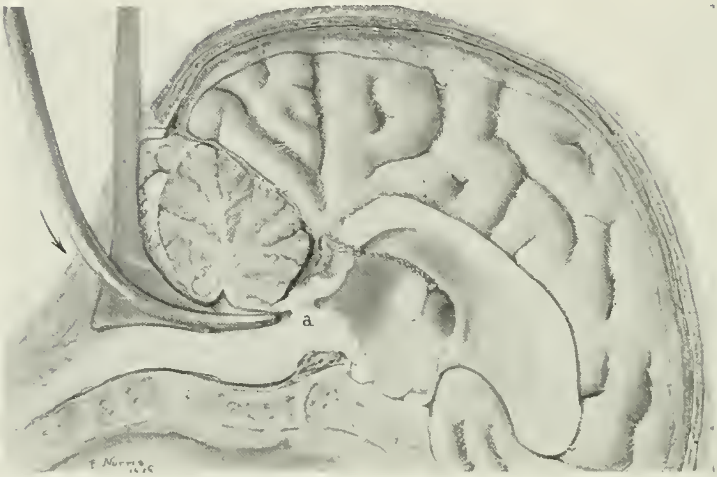


Fig. A.—Sagittal view of brain, to show stricture at the aqueduct and the method of piercing it with a steel catheter preparatory to the introduction of the rubber tube.

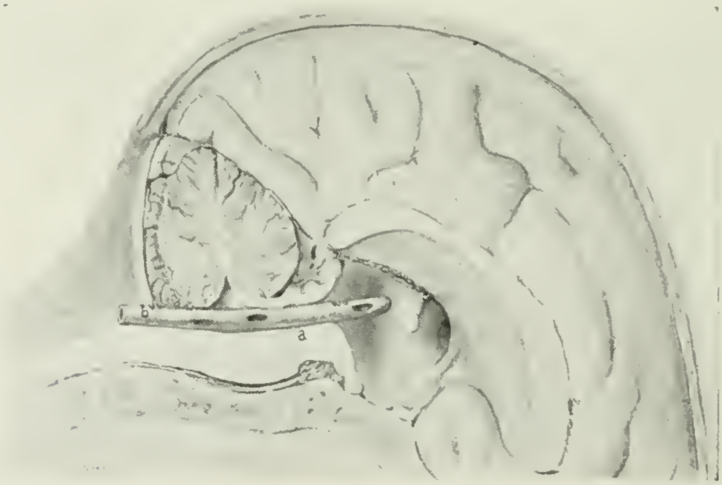


Fig. B.—Sagittal view of brain, showing tube in position in the aqueduct of Sylvius. Openings are made in that part of the tube which lies in the third and fourth ventricles. The tube is firmly anchored to the dura with a silk suture at *b*. The tube is buried complete when the occipital muscles and the skin are closed.

The cases which comprise the particular group referred to in this paper are due to stenosis of the aqueduct of Sylvius (*Plate XVII*). The vast majority of these cases begin in the pre-natal period. The subdivision of most cases of hydrocephalus into two main classes, communicating and obstructive, still holds. The differentiation into these two great groups is clinically possible and easy of accomplishment by using a coloured-dye test. If, after injection of the dye into a lateral ventricle, it quickly appears in the spinal canal (lumbar puncture), there is communication between the ventricles and the subarachnoid space; this type of hydrocephalus is called 'communicating'. The absence of the dye in the spinal fluid denotes an obstruction at some point in the ventricular system; this type is known as 'obstructive'.

According to the author's statistics, stenosis of the aqueduct is the causative lesion in about one-half of all cases of hydrocephalus occurring congenitally. All of these cases have essentially the same microscopic pathology. In each instance, only epithelial remnants of the lining ependyma remain, and a hypertrophy of the glial tissue replaces the defect. In the gross, the region of the occluded iter differs but little from the surrounding mesencephalic tissue. There is usually no increased density noticeable to the touch, and one gets the impression of a normal mesencephalon minus the aqueduct. In one of their cases, however, the region of the aqueduct appeared fairly sharply circumscribed, almost like a tumour; it was much harder and more fibrous, but microscopically the picture was similar to that of the others.

In 4 out of 7 cases the entire length of the aqueduct was occluded. In one the stricture was not quite complete. In one case the stricture was a very thin diaphragm which transmitted light, and should easily have been amenable to treatment. In another case there were two obstructions in the ventricular system, one at the iter, the second at the base of the brain; the fourth ventricle, which intervened between the strictures, was markedly dilated, as would be expected from failure of its fluid to escape into the cisterna magna.

Cause of Stricture of the Aqueduct.—During early embryonic development, the aqueduct of Sylvius shows no differentiation from the remainder of the neural tube. Everywhere the entire neural canal, including the aqueduct of Sylvius therefore, must necessarily have been patent and linked by epithelium. It is easy to understand how the foramina of Luschka and Magendie may be impermeable, simply because they have failed to develop, because they are secondary openings from a primary closed neural tube; but a hypothesis such as this is not tenable in explaining stenosis of the aqueduct of Sylvius. Since, therefore, the aqueduct of Sylvius is primarily an open tube, its closure must be secondary and never due to agenesis. The presence of microscopic epithelial remains, and occasionally of a minute patent channel, evident at times even macroscopically, serve as supporting evidence that the iter had been in existence but had been subsequently occluded by some normal process.

Glia behaves essentially as does connective tissue. Its growth must be secondary and not primary. It would be difficult to imagine a primary rampant growth of connective tissue beyond the confines of a normal epithelial lining. It would appear more probable that a primary destruction of the epithelial lining of the aqueduct had resulted, and the natural attempt of nature to heal the breach by glial tissue had resulted in the stenosis of the iter at the affected zone. Such a hypothesis, and of course more it cannot be, is supported by the method of formation of stenoses elsewhere in the body, either by trauma plus infection, or even by infection alone.

An Operative Treatment for Strictures of the Aqueduct.—In an attempt to treat the cause directly, the author proposes a method of reconstructing the obliterated aqueduct of Sylvius. In probably the majority of cases which are collected here, the entire aqueduct is obliterated by a very dense scar. It is hardly to be expected that any new channel as long as the iter can be permanently maintained after reconstruction, when the entire aqueduct is involved. But in those cases where only a small portion of the aqueduct is occluded, and ideally perhaps where the aqueduct is crossed by a thin diaphragm, as where the obstruction is only partial, a restoration of the iter would appear to be a hopeful possibility.

The operation has been performed twice, on children of 1 year and 5 years old. There was very little reaction to the operation in either case. The older child died seven weeks later of pneumonia; the younger child is still living. The various steps in the operation are shown in the accompanying drawings (*Plates XVIII–XXI.*)

REFERENCES.—[1]*Johns Hop. Hosp. Bull.* 1921, March, 67; [2]*Surg. Gynecol. and Obst.*, 1921, Feb., 112; [3]*Ibid.* 1920, Oct., 340.

IMPETIGO CONTAGIOSA.

E. Graham Little, M.D., F.R.C.P.

Farley and Knowles[1] have attempted to classify anew the varieties of streptococci found in impetigo contagiosa. They confirm the common experience that the causative lesion is a streptococcus, and state that at least four varieties are met with. In the 30 cases examined, which form the subject of this paper, streptococci were found in 24 cases (pure cultures in 10 cases): *Streptococcus pyogenes* 10, *Streptococcus anginosus* 11, *Streptococcus subacidus* 2, *Streptococcus fæcalis* 1. Staphylococci were found 22 times in 16 cases (mostly associated with other organisms); *Staphylococcus albus* 16 times (2 pure), *Staphylococcus aureus* 6 times (never pure). *Pseudodiphtheria bacillus* was found 4 times (never pure). *Bacillus pyocyaneus* was found once and *Staphylococcus citreus* once.

The organisms other than streptococci are regarded by both the authors as contaminations. They comment on the rarity of *S. fæcalis* as compared with experience in Flanders, where it was common.

REFERENCE.—[1]*Arch. of Dermatol. and Syph.* 1921, June, 753.

INCONTINENCE OF URINE. (*See* BLADDER, DISEASES OF.)

INCONTINENCE OF URINE IN CHILDREN. (*See* URINE, INCONTINENCE OF.)

INDUSTRIAL HEALTH.

Joseph Priestley, B.A., M.D., D.P.H.

Work-Environment.—The average workman spends about one-quarter of his adult life in the factory or workshop, and it is, consequently, necessary to study his work-environment, with a view to seeing how work-output can be kept up to a maximum. The actual factors in work-environment are lighting, heating (including humidity), ventilation, vibration and noise, and dust. These factors are, speaking generally, admitted by employers and employees as the result of experience; but it is, nevertheless, satisfactory to have the subject scientifically worked out (as is at present being done) by the Industrial Fatigue Research Board, appointed by the Medical Research Council and the Department of Scientific and Industrial Research jointly. The relation between accident incidence and output has also been investigated. Accident incidence is not a matter of chance, but depends on the victims' personalities. Conditions of employment also play a part, e.g., temperature and lighting. The best temperature to work in to avoid accidents is 67·5°, the temperature at which accidents are at a minimum, increasing in number when that temperature rises and falls. The number of accidents increases with the use of artificial light as compared with daylight, especially in the case of falling. 'Surface' accidents in mines increase greatly during the winter months, when artificial light has to supplement or replace the daylight. It is interesting to note the fact that 'underground' accidents actually decrease in number during the winter time (artificial light alone being in use, of course).

Coal Miners' Nystagmus.—Attention has been drawn to the importance of fixing a standard refraction test for coal miners before they commence work underground, with the object of diminishing the incidence of miners' nystagmus —refractive errors of eyesight being the great predisposing cause of that disease. Nystagmus is not hereditary, but refractive errors are. Hence the importance as a preventive measure of examining the eyesight of underground workers (before underground work is commenced) by the simple use of Snellen's test and the fixing of a standard to be used in such test—not less (to begin with) than $\frac{6}{18}$ for each eye separately. In this way, grave nystagmus would be practically eliminated from the coalfields. Intending underground miners who failed to pass the test would either be refused that particular (underground) employment or put under the care of a factory surgeon (with special knowledge of refraction eye work) for future observation and treatment until they had passed the test. In this way, a man would be prevented from carrying out an unsuitable employment (unsuitable from the point of view of that particular man's health), whilst, at the same time, refractive errors would be corrected— a desirable end whatever other forms of mining work may have to be carried out. Compensation claims would cease or be much reduced in numbers, and accidents would be prevented. Output would be increased. The employees, the employers, and the nation as a whole would benefit.

INFANCY, PYELITIS IN. (*See* Pyelitis in Infancy and Childhood.)

INFANT FEEDING.

Frederick Langmead, M.D., F.R.C.P.

Natural Feeding.—Langer's[1] researches provide another explanation for the incontestable advantages of breast milk. His work goes to show that infants fed naturally harbour strains of colon bacilli with only slight proliferating power, in contrast to those fed artificially, in whom strains of high proliferating power are found. The latter he regards as related to dyspepsia, though they are only of importance during the early months of life, since an immunity is gradually induced. Later they constitute the normal intestinal flora. He describes in detail 55 cases in which the colon-bacillus index was estimated. The strains were classified according to the control they exerted over the growth of typhoid bacilli.

W. A. Mulheim[2] questions the necessity of immediate weaning with the intercurrence of pregnancy. Very rarely does it cause the milk to resemble colostrum or give rise to digestive disturbances, while in some cases the breasts continue to secrete freely a milk of good quality. He regards slow weaning as more rational and especially important in the summer months. He also advises against immediate weaning should the mother suffer from typhoid fever, first because of the slight susceptibility of the nursling, secondly because the diagnosis is generally made after the period during which the mother's blood contains most organisms. He favours complementary feeding as against supplementary feeding, holding that when a breast fails to give sufficient milk it wants not a longer period of rest but more stimulation. With this practice, which is becoming increasingly frequent, few will disagree, especially in view of the fact that one bottle-feed given as an alternative to a breast-feed is almost invariably soon followed by others, whilst by complementary feeding about 90 per cent of infants can escape early weaning. As he points out, with complementary feeding, breast-milk can be established, maintained, and re-instituted.

Dried Milk.—A very strong criticism on the milk-supply is the prominence of dried milk in modern infant feeding, for there is no doubt that dried milks are advocated by many because so-called fresh milk is generally unreliable and often dangerous, especially in the summer months, not because they prefer them on other grounds. J. Burnett[3] contravenes the claims that dried milk never disagrees, nor produces rickets or scurvy, and time and again he has met with cases in which it proved quite unsatisfactory, and in which infants so fed developed anæmia, rickets, or scurvy, and failed to thrive. He quotes four representative cases in support of his contention. His clinical experience agrees with the experimental observation that dried milk is less antiscorbutic than milk which has been scalded, and he finds that rickets is common in infants fed on dried milk, and that such infants are often anæmic. He deplores the official recognition of dried milk by Public Health Authorities as postponing indefinitely the day when a pure milk-supply will become available.

R. J. Blockham[4] has always been a strong advocate of dried milk. Comparing it with fresh milk, he says that some authorities consider it superior to sterilized cow's milk or even humanized cow's milk, whilst others regard it as a temporary diet to be given for a short time when other foods disagree. In most cases increased experience with the product has led to greater confidence in its employment. [The words 'sterilized' and 'humanized' in this context may mean little or much, for 'sterilized' is often used indifferently for scalded, boiled, pasteurized, or actually sterilized milk, and 'humanized' has many different applications.—F. L.] Regarding nutritional value, he says that French writers consider dried milk safer than town milk and of equal nutritional value. Other advantages are its digestibility, its suitability for warm weather, and its value in pathological conditions. The link between these divergent views is to be found in Sir George Newman's report for 1907, in which he said that dried milk is an excellent substitute, " not for breast milk and not for really good cow's milk, but for much of the milk on which infants are now fed ".

Stools and their Relation to Feeding in Infants.—Joseph I. Grover[5] has written a valuable paper on the characters of infants' stools. Breast-fed babes, he says, have usually from two to four a day, while those fed artificially have but one or two, and many would miss a day were it not for a laxative. Frequent stools are the result of increased peristalsis due to irritation. If a stool is acid or alkaline enough to excoriate the buttocks, it will also undoubtedly inflame the mucous membrane of the large intestine, a happening which is frequent in the fermentative type of dyspepsia. Casein curds may also enhance peristalsis, and boiling the milk, by preventing the curds, may alone suffice to reduce the number of the stools. When the mucous membrane is irritated there is invariably produced for protection an abnormal quantity of mucus, so that mucus is usually observed in frequent motions.

The reaction of infant stools is usually acid because of the greater proportion of fat and carbohydrate to that of protein in the food. When the food contains little fat and sugar and much protein, as in skimmed milk, the stool is usually alkaline. The stools of infants fed on breast-milk are almost always acid, and those of infants who are digesting cow's milk well are nearly neutral.

Starvation stools are small, few, sticky, very dark, and composed mostly of detritus, bacteria, and mucus ; the darkness is due to the concentration of bile pigments. These starvation stools result from too little food entering the small intestine, owing either to the nature of the food, vomiting, or an inability to swallow enough food, and are a sign of insufficient feeding rather than of indigestion.

The 'high protein stool' is the result of a small proportion of fat and a high proportion of protein in the food, rather than of too much protein, and is not a sign of indigestion. Its most characteristic feature is its shiny surface when divided. Such stools are especially produced by feeding with fat-free milk undiluted, and boiled for three minutes. They are semi-formed and watery when passed; but soon dry, and number from two to five daily. They have a tint of olive green, either a little yellowish or brownish. In addition to their glossiness, they are very smooth and homogeneous and appear transparent. Such a stool would almost certainly rule out the diagnosis of diarrhœa of an infectious nature, and would tend to show that it was due to a mild fat or carbohydrate indigestion or to some parenteral disturbance. A little fat in the food will render the stool opaque and greyish; but if a fair amount of protein is present the gloss will remain. As the fat is increased and the protein reduced, a point is reached when the stool loses its gloss and becomes dull—the soap stool.

Casein curds are coloured exteriorly like the rest of the stools, but if picked out and rubbed, their central portion is found to be clear white. A baby fed on unboiled fat-free milk will often pass stools consisting of casein curds and mucus, the latter presumably from irritation. Boiling of the fat-free milk produces the 'high protein stool' in which casein curds are seldom found. If unboiled whole or diluted milk is employed, the casein curds are found embedded in stools composed mostly of soaps. When casein curds are passed, after being almost digested, they form small yellowish masses resembling mucus, and may be found apart from the more characteristic casein curds. Breast-milk does not form casein curds.

When a baby is fed on a mixture containing 2·5 to 3 per cent of fat and 1 per cent or less of protein, practically nothing is found in the stools but soaps. If some carbohydrate be added to the fat, the carbohydrate will be absorbed and add nothing to the stool. As protein is added in increasing quantities, there comes a time when the protein appears in the stools as solid matter which does not break down into globules with heat and acetic acid. The normal stool contains soaps and protein matter. If the fat in the food is high and the protein low, a characteristic soap stool results, provided that there is no indigestion. Such a stool is formed, is of a very light colour, and is usually dried and firm. Some are dry and white. Soap stools seldom exceed two a day in number, and are generally acid in reaction. With the addition of more protein, more and more of the stool will not break down with heat and acetic acid.

Stools containing much fermented starch are loose, acid, light brown, excoriate, and contain much mucus. This form of stool is found most often in the case of babies who are receiving certain of the starchy proprietary foods. Indigestion of sugar, he says, produces no characteristic stool. Those resulting from sugar fermentation are frequent, very acid, excoriating, and watery. The solid parts are usually full of small air-bubbles. The colour is generally green from the action of the acids on the bile pigments.

REFERENCES.—[1]*Zeits. f. Kinderheilk.* 1920, Aug. 16 (abstr. in *Jour. Amer. Med. Assoc.* 1920, Nov. 20, 1461); [2]*Jour. Amer. Med. Assoc.* 1920, Sept. 25, 855; [3]*Practitioner,* 1921, March 170; [4]*Ibid.* 1921, May, 342; [5]*Jour. Amer. Med. Assoc.* 1921, Feb. 5, 365.

INFANTILE PARALYSIS. (*See also* ORTHOPÆDIC SURGERY.)

J. Ramsay Hunt, M.D.

Early Orthopædic Treatment of Infantile Paralysis.—This is outlined by Legg[1] as follows:—

During the sensitive stage the patient should be at perfect rest. No active treatment should be started until tenderness has entirely disappeared. All beginning deformities should be corrected as soon as they appear. An accurate muscle examination of the entire body should be made before starting any treatment. Sitting and walking should be prohibited for two or three months at least, and then allowed only when the patient can be kept in a normal position. Braces should be applied (1) to prevent deformity, (2) to allow locomotion. Fatigue must be constantly guarded against. Massage and muscle training is the best method to re-establish power.

REFERENCE.—[1]*Boston Med. and Surg. Jour.* 1920, Nov. 25, 635.

INFANTS, DYSPEPTIC DISORDERS IN. (*See* DYSPEPTIC DISORDERS IN INFANTS AND YOUNG CHILDREN.)

INFECTIOUS DISEASES PREVENTION. *Joseph Priestley, B.A., M.D., D.P.H.*

Infectivity of Tuberculosis.—Emphasis has been laid recently on the very low degree of infectivity of tuberculosis, such infectivity not being very obvious, and consequently it is suggested that too much stress should not be laid on it. The vast majorities of people at one time or another suffer from (or, rather, are affected by) tuberculosis, but very large proportions of those affected recover without permanent injury and even without the disease ever having been diagnosed at the time of attack. 'Open' must be strictly differentiated from 'closed' tuberculosis from the point of view of infection and the taking of preventive measures—the latter (the 'closed' tuberculosis) being harmless and not capable of being transferred to others. In the pulmonary form, direct droplet infection during a patient's coughing, sneezing, etc., is, of course, a source of danger to others, but, in this case also, the low degree of infectivity of tuberculosis must be remembered. It is due to this low degree of infectivity that only the simplest precautionary measures are necessary, and that *home* sanatorium treatment becomes practicable. Home life is essential for the patients who themselves can keep the disease at bay by carrying out simple forms of treatment and preventive measures—a well-regulated life under open-air conditions, sufficient exercise, rest and sleep, and a proper diet. (*See also* TUBERCULOSIS, PULMONARY.)

Anthrax in Shaving-brushes.—The Ministry of Health has recently issued a circular to sanitary authorities throughout the country, again drawing attention to the danger of anthrax being spread by shaving-brushes—those brushes made in this country from what may be anthrax-infected hairs or bristles imported from abroad ; and stating that hairs or bristles after manufacture into brushes cannot be effectively sterilized. For the protection of the public health, therefore, it is necessary for hairs or bristles to be disinfected by saturated steam before being made into brushes, and, for that purpose, that brush manufacturers should be given facilities for this necessary efficient disinfection to be carried out by local authorities possessing efficient steam disinfecting apparatuses, upon terms to be mutually agreed upon. Shaving-brushes are not the sole offenders : there are tooth-brushes, nail-brushes, etc., to be remembered.

Diphtheria Prevention by means of the Schick Reaction and Toxin-antitoxin Immunization.—The well-known preventive measures, which are in use in all infectious disease outbreaks (including diphtheria), are (1) notification, (2) hospital isolation, (3) disinfection, and (4) medical inspection of contacts. *Efficiently* carried out, such preventive measures are sufficient. In the case of diphtheria, a variation or an extension of these preventive measures has been recently introduced into England (Bristol) from America, and has been found to be of value in dealing with diphtheria outbreaks in small populations, e.g., schools or other institutions. The variation or extension consists in finding out the diphtheria-susceptibles and in immunizing them. The Schick test or reaction is used for the discovery of the susceptible, and is a convenient clinical test by which the antitoxic immunity of individuals to diphtheria, and consequently their susceptibility or otherwise to the disease, can be determined. It consists of injecting intradermally into the flexor surface of the forearm a fresh normal saline solution of diphtheria toxin prepared so that 0·1 c.c. or 0·2 c.c. represents $\frac{1}{50}$ M.L.D. (minimum lethal dose) for a 250-grm. guinea-pig. A 1-c.c. record syringe, graduated in tenths, with a fine steel or platinum-iridium needle, is recommended. The insertion of the needle into the proper layer of the skin is of the greatest importance, and the operation requires a certain amount of practice to enable the operator to carry out the procedure smoothly. The result of the tests should be observed 24, 48, 72, and 96 hours afterwards. The test consists of a reaction, which appears at the site of injection as a positive, negative, pseudo-, or combined positive and pseudo-reaction.

The positive reaction is indicated by a roughly circular area of a deep-red colour around the site of injection, and is due to the irritant action of the toxin upon tissue cells which are not protected by antitoxin. A positive reaction indicates, therefore, that no antitoxin exists in the patient's blood, and that, in consequence, there is an absence of immunity to diphtheria. The extent of local reaction varies with the relative susceptibility of the individual.

The *pseudo-reaction* is indicated by a small central area of deep-red colour (around the site of injection), together with a secondary areola, which shades off gradually in varying degrees of infiltration into the surrounding skin.* The pseudo-reaction probably represents a local anaphylactic response of the tissue cells to the protein substance of the autolyzed diphtheria bacilli, which is present in the toxic broth used for the test.

The *combined reaction* presents the elements of both the positive and the pseudo-reaction in the same individual—a distinctly defined central red area (around the site of injection), together with well-marked infiltration which is the first to disappear, leaving the central red area.

Negative Schicks are immune to diphtheria ; *positive* Schicks are susceptible to diphtheria. In a suspected school or other institution, the negatives can be left alone, but the positives must be immunized by means of inoculations of a standardized toxin-antitoxin mixture—commencing the inoculations with a minimal dose, e.g., 0·01 c.c. solution, prepared according to the generally accepted standards of bacteriologists. By this method a diphtheria-proof population can be secured.

The points to be remembered are : (1) To use a standard toxin of definite strength ; (2) To secure correctness of technique ; (3) To interpret results correctly. Control injections with toxin solution, heated previously to a temperature of 75° C. for ten minutes, are valuable. These control injections should be made on the *opposite* forearm.

Diphtheria 'Carriers'.—There are two forms of carriers : (1) convalescent, and (2) contact. Each form is to be sub-classified into (*a*) transient, and (*b*) chronic. Of the convalescent carriers, 80 per cent (roughly) retain the germs for four weeks from the onset of the disease ; the other 20 per cent show, as the causes of the germs persisting, abnormal conditions of tonsils, adenoids, and rhinitis (together with otorrhœa). The same remarks apply practically to contact carriers. The virulence of the germ varies enormously. In some instances of contact carriers, the germ is avirulent, and, in the opinion of American observers, cannot become virulent. Naturally this question of virulency or non-virulency of diphtheria germs is of great importance, and can only be definitely settled by resort to animal experiment, the inoculation of a guinea-pig. Culturally and morphologically they are indistinguishable.

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* The pseudo-reaction may, on occasion, be of a uniform colour (redness) and even more extensive in area than the true positive reaction.

No certain curative treatment of carriers has yet been devised. Suggestions have been legion—bacteriological, chemical, surgical, and pharmaceutical. The removal of adenoids, tonsils, etc., goes without saying, but we are still left with an enlarged glandular tissue in the pharynx, nose, or nasopharynx, which cannot be removed surgically, but which forms a *nidus* for the continuous growth of the germs of diphtheria in a saprophytic form outside the body. The practical difficulties of getting at the germs in their 'dug-outs' and entrenchments with sprays or swabbings of disinfectants are well known, whilst bacteriological methods offer no hope in securing an efficient or effective autogenous vaccine, though successful results are reported from the repeated use of a **Diphtheria Endotoxin** by subcutaneous inoculation at intervals of seven to ten days. **Detoxicated Vaccine** has also been favourably reported upon in a few instances. One important practical lesson to be learnt from the doubts that at present obtain is that it is safer to regard a diphtheria carrier as a potential (if not an actual) danger to health—at least, until the opposite is proved—and to take officially preventive measures accordingly, including the notification of such a carrier to the medical officer of health. (*See also* DIPHTHERIA.)

The Campaign against Syphilis.—Syphilis is of all human scourges the most serious, if we bear in mind its direct and indirect results. Acquired and congenital infection must be differentiated as far as possible in classifying results (both morbidity and mortality)—especially, for instance, in the case of nervous-system diseases and diseases of the cardiovascular system. The *Spirochæta pallida* has been tracked to its lair and must, at all costs, be exterminated. Bacteriological methods are now at hand. The suppression of the disease should be attainable, depending, as it does, upon: (1) Educational propaganda; and (2) Dispensaries or clinics. Treatment must be regular and systematic, and prolonged until the disease is eradicated. Diagnosis must depend to a large degree upon bacteriological methods, but special clinical attention must be paid to the nervous and circulatory systems. Serological tests are important. Moral control is undoubtedly an important factor, but it is now admitted that it cannot be depended upon entirely. Practical experience points to preventive methods and immediate treatment, and, to act upon such experience, sanitary or health authorities have now no alternative but to offer facilities accordingly in those directions. At present, a big fight is going on between two anti-venereal associations in Great Britain upon this important question of 'preventive measures', with the result that the disease spreads meanwhile. Medical practitioners must be educated in both diagnosis and treatment, and the anti-syphilis dispensaries or clinics must consequently be thrown open to them, as also must the bacteriological and serological laboratories that should be connected therewith. (*See also* SYPHILIS.)

INFECTIVE JAUNDICE. (*See* JAUNDICE, INFECTIVE.)

INFLUENZA. (*See also* EYE AFFECTIONS.)

J. D. Rolleston, M.D.

ETIOLOGY.—A. Malloch and L. J. Rhea[1] state that at present there are four views as to the etiology of influenza: (1) That it is due to a specially virulent strain of *B. influenzæ*, although the serious effect of other micro-organisms acting as secondary invaders is granted; (2) That it is caused by a filterable virus; (3) That like measles and other exanthemata it is a general systemic infection of unknown causation, and that various organisms such as the pneumococcus, streptococcus, etc., acting as secondary invaders, step in and produce very severe and at times fatal effects upon the patient, whose resistance has been lowered by the attack of influenza ; (4) That influenza is due primarily to a mixed infection in the widest sense of the term, that is, *B. influenzæ*, the pneumococcus, the streptococcus, and perhaps other agents growing in the closest association and interacting upon one another, produce an 'obligate complex virus' (Sahli).

The theory of a filterable agent being the primary cause of influenza is supported by Milton W. Hall,[2] who by injection of bacteriologically sterile filtrates of sputum from early cases of influenza into the circulation was able to produce in animals (rabbits, guinea-pigs, and mice) lesions of a uniform type uncomplicated by the presence of demonstrable bacteria. The lesions thus produced were characterized by hæmorrhage, a peculiar lytic change in the effused blood, infiltration by small mononuclear cells and eosinophils, and healing by carnification, comparable with those reported as characteristic of influenza in so far as primary lesions may be separated from those produced by secondary invaders. Control experiments with non-influenzal sputum and with extract of normal lung were negative. By injection of filtrates of lung emulsions from infected animals the same lesions could be produced in other animals and the passages apparently continued indefinitely.

C. M. Richter[3] maintains that there is no proof that influenza is caused by bacterial infection, but considers that its transmission is more logically explained by an air which may carry an infective virus or poisonous gas into the lungs ; and holds that influenza pandemics depend on certain weather conditions for their development. He states that an increase in pneumonia morbidity may be predicted whenever an extensive anticyclone is approaching a particular territory, and there is a warning of a coming explosiveness of morbidity in general whenever the magnitude of the approaching cyclone warrants it.

H. J. B. Fry and C. Lundie,[4] from examination of 15 cases of influenza, found that an antigen prepared from an organism isolated in the third wave of the epidemic showed fixation of complement with sera derived from cases of influenza, whether these cases were recent or had occurred in previous waves of the epidemic. This complement-fixation was absent in the sera of normal individuals who had never had influenza, as well as of those suffering from other specific diseases, and without any recent history of influenza. An antigen prepared from another organism showed no fixation of complement with sera from cases of influenza. A. Engel,[5] who examined 33 cases of influenza, found a positive complement-fixation reaction in 60 per cent and a negative reaction in 40 per cent. The reaction, which was positive during the febrile stage, gradually became negative after the temperature had become normal.

Epidemiology.—Sir William J. Thompson,[6] Registrar General for Ireland, states that during 1918, out of a total of 78,695 deaths from all causes registered, no less than 10,651 deaths, or 13·5 per cent, were ascribed to influenza. Of all the deaths from influenza in 1918, 55 per cent were in persons between 15 and 45, as compared with 12·5 per cent for 1900 and 16·0 per cent for 1892. Deaths of persons 45 years and upwards in 1918 were equivalent to 23·7 per cent of the total deaths from influenza in that year, those at 55 and over being only 15·5 per cent ; 11·8 per cent of the deaths were in children under 5 years.

According to P. W. Bassett-Smith,[7] the epidemics of influenza which occurred in the Navy in 1918–19 were similar in many respects to those which occurred on shore, but the close proximity of cases in barracks and ships tended to make the spread of infection more easy than in many other places. The total number of cases during 1918 reported from home and foreign stations was 80,144 with 2322 deaths, or a mortality of 2·94 per cent. The mortality was much greater in the autumn than in the spring epidemic.

W. W. Cadbury[8] states that three distinct epidemics occurred at Canton in the spring, summer, and winter of 1918, at the same time as the disease appeared in Europe and America. The spring epidemic was mild, the fever lasting only four days at most. The second and third epidemics were more severe; cases of pneumonia developed, and the fever usually lasted four to five days. Foreigners in Canton were rarely affected and had only slight attacks. The mortality was relatively low, the disease being much less malignant in Canton than in the United States.

A. H. Macklin[9] reports an epidemic of considerable severity but short duration among the Lapps in the winter of 1918–19. All the sick cases as they occurred were thrust into bug-infested single rooms and left there unattended until they died or recovered. About 50 per cent of all cases died.

Morbid Anatomy.—W. G. MacCallum[10] distinguishes the following groups of influenzal pneumonia: (1) Cases terminating fatally after a brief course, with characteristic dilatation of the ductuli alveolares. In some of these there are abundant pneumococci; in the rest various bacteria in very small numbers. (2) Cases terminating fatally, with great numbers of pneumococci in the lung and elsewhere, and with a diffuse pneumonic consolidation in which the peculiar changes in the ductuli are masked or absent. (3) Cases in which a peculiar and characteristic pulmonary lesion is due to an overwhelming infection with *Streptococcus hæmolyticus.* (4) Cases in which *B. influenzæ* is predominant or in pure culture. These fall into two groups, in one of which acute peribronchial infiltration is accompanied by extensive hæmorrhage and œdema, while in the other the slow course leads to the production of hard, nodular peribronchial interstitial infiltrations of the tissue, and exudation into the alveoli and bronchi.

Symptoms.—W. Hildebrandt[11] uses the term *chronic influenza* for the morbid processes caused by *B. influenzæ,* which may last for months whether anatomical changes are present or not. He maintains that influenza should be regarded not only as an acute but also as a chronic infectious disease, and as the most important affection of the respiratory system next to tuberculosis. The difficulty of distinguishing the chronic form of influenza from pulmonary tuberculosis is often impossible even for the most experienced clinician, especially as both diseases may coexist or one may supervene directly on the other. During the last three years, 20 out of 526 cases of influenza observed by Treupel and Stoffel[12] were examples of this kind.

T. H. Russell[13] emphasizes the frequency in influenza of *symptoms simulating an acute abdominal lesion*, especially appendicitis and cholecystitis. Although in some cases a differential diagnosis is extremely difficult, the safest procedure in doubtful cases is expectant treatment. If an exploratory operation is decided upon, a local anæsthetic is advisable. Although a surgical abdominal lesion may occasionally co-exist with influenza, the great majority of cases of influenza with abdominal symptoms have no surgical basis, but are either reflex or are due to some condition which would not be benefited but rather harmed by laparotomy (*see also* Medical Annual, 1921, p. 261).

According to K. A. Menninger,[14] the effect of influenza upon epilepsy is not uniform. A beneficial influence is occasionally observed; seizures are usually absent during the febrile state, and sometimes occur with decreased frequency after the acute infection. Deleterious influence, however, is more common. The seizures are more frequent and severe. Epileptic attacks which have long been latent are roused into renewed activity; and various psychoses developing epileptiform syndromes which resemble typical idiopathic epilepsy—except that recovery usually occurs in a short time—are occasionally evoked by influenza, being probably the manifestation of multiple miliary (encephalitic) hæmorrhages. The majority of epileptic patients, however, do not show any change in their disease as the result of influenza. The effect of epilepsy on influenza is a lowered resistance giving rise to increased morbidity and mortality rates.

M. F. G. Main[15] records a series of cases in which influenza appeared to be a potent factor either in initiating the illness, such as diabetes mellitus or pernicious anæmia, or in aggravating a disability already present, such as auricular fibrillation, chronic nephritis, disseminated sclerosis, and chorea.

F. Jamin and E. Stettner,[16] from their experience of an epidemic of *influenza among children*, state that the sexes were almost equally affected. The female sex, however, offered less resistance to the influenzal virus, and was therefore more subject to bronchopneumonia and showed a higher mortality. Contrary to the general rule that in adults it is the most vigorous persons who succumb, in children the great majority of the severe and fatal cases had some constitutional weakness or recent disease, especially pneumonia. Certain age periods showed a definite tendency to various symptoms. Epistaxis was not observed until after the third year, while tracheal stenosis only occurred up to the third year. In early childhood respiratory complications were especially dangerous and obstinate.

M. W. Thewlis[17] remarks that *influenza in old age* is a fatal disease, primarily because of its tendency to develop into pneumonia, and secondarily because it is prone to cause other serious complications or aggravate pre-existing disease, especially nephritis and diabetes. Convalescence is slow, even without any complications. The diagnosis is often difficult owing to the absence of classical symptoms.

Blood.—From investigation of the blood in 65 cases of influenza, F. Harry[18] came to the following conclusions: (1) In mild cases there are a leucopenia and relative lymphocytosis, the eosinophils are entirely absent or much diminished, and the mononuclears and transitionals usually increased. (2) In complicated cases there are hyperleucocytosis and relative polymorphonuclear leucocytosis. The eosinophils, mononuclears, and transitionals are the same as in the mild attacks. (3) After the temperature has become normal the leucopenia is replaced by leucocytosis, the lymphocytosis persisting until finally a normal count is re-established. (4) The extension of a bronchopneumonic process is shown by an increase in the polymorphonuclears, which is thus a guide to prognosis. Harry attributes the conflicting results obtained by various observers to the cases observed not having been pure influenza, and to the tendency to diagnose every febrile catarrh as influenza during an epidemic.

R. A. Kinsella and G. O. Brown[19] found that the coagulation time in influenza was delayed without there being a relation between the degree of delay and the severity of the disease. The number of platelets was reduced in such patients. Neither of these conditions was affected by the onset of secondary infection, although the number of leucocytes was usually greatly increased.

D. S. Hacker and R. Isaacs,[20] from examination of 21 patients in different stages of influenza and bronchopneumonia, found that there was a depletion in the *alkali reserve*. The depletion might be rapid or gradual, and was not much influenced by moderate doses of alkali by mouth. The alkali reserve when compared with the temperature served as a prognostic sign and was a definite indication for the methods of treatment. An alkali reserve of 46 or below (in spite of moderate doses of alkali by mouth) was found in conditions in which the prognosis was bad, from 46 to 52 when the prognosis was doubtful, and 53 or above when the prognosis was good. The alkali reserve did not give a clue as to the occurrence of complications. The blood-sugar was not markedly influenced by the variation in the clinical course of the disease. There was no definite relation between the amount of cyanosis and the alkali reserve.

Treatment.—M. W. Thewlis[17] recommends gargling every half-hour with a 2 per cent solution of **Chloral Hydrate,** which has both a local anæsthetic and an antiseptic action, preceded by the administration of 2 to 4 gr. of calomel, and followed in three hours by ½ oz. of magnesium sulphate.

Naessens[21] has obtained good results in influenzal bronchopneumonia in children by **Subcutaneous Injections of Oxygen.** The immediate results were disappearance of cyanosis, relief of dyspnœa, improvement of the pulse in strength and regularity, rise of blood-pressure, and fall of temperature. No change occurred in the blood-picture.

L. Borchardt and B. Ladwig[22] employed **Intramuscular Injection of Milk** in doses of 5 to 10 c.c. in 98 cases, most of which were severe, and frequently observed a critical fall of temperature in the next twenty-four to forty-eight hours and resolution of commencing pneumonia, after other methods had failed.

References.—[1] *Quart. Jour. Med.* 1921, 125; [2] *Arch. of Internal Med.* 1920, ii, 612; [3] *Ibid.* 1921, *i*, 361; [4] *Lancet*, 1920, i, 368; [5] *Wien. klin. Woch.* 1920, 493; [6] *Dublin Jour. Med. Sci.* 1920, 174; [7] *Jour. R.N. Med. Service*, 1920, 432; [8] *Med. Record*, 1920, i, 391; [9] *Brit. Med. Jour.* 1920, i, 465; [10] *Johns Hop. Hosp. Rep.* 1921, 149; [11] *Münch. med. Woch.* 1920, 1008; [12] *Ibid.* 1921, 763; [13] *N. Y. Med. Jour.* 1920, ii, 216; [14] *Amer. Jour. Med. Sci.* 1921, i, 884; [15] *Glasgow Med. Jour.* 1921, i, 267; [16] *Med. Science*, 1921, iv, 303; [17] *N. Y. Med. Jour.* 1920, i, 765; [18] *Med. Science*, 1921, iv, 296; [19] *Jour. Amer. Med. Assoc.* 1920, i, 1070; [20] *Ibid.* 1920, ii, 1624; [21] *Med. Science*, 1921, iv, 305; [22] *Ibid.*

INFLUENZA AND MENTAL DISEASE. (*See* Mental Disease.)

INSOMNIA. (*See* Psychological Medicine.)

INTERTRIGO. (*See also* Skin Diseases, General Therapeutics.)

E. Graham Little, M.D., F.R.C.P.

Behm[1] comments on the frequency of intertrigo as the result of waterproof coverings so frequently and so wrongly put on children to prevent wetting of the bed. This may be treated with 5 to 10 per cent watery solution of **Silver Nitrate.** Behm recommends the application of a mixture of 5 to 2 per cent watery solution of **Formalin** with equal parts **Ether.** The parts are protected afterwards with **Vasenol** or **Diachylon,** and kept dry. The same method acts well in impetigo, eczema after pediculosis, furunculosis, pyodermias generally, pityriasis versicolor, etc.

Reference.—[1] *Münch. med. Woch.* 1920, Oct. 24, 1173.

INTESTINE, SMALL, SURGERY OF.

E. Wyllys Andrews, A.M., M.D., F.A.C.S.

Intestinal Obstruction.—There has been a great deal of work done in recent years on the subject of acute intestinal obstruction. As the nature of the toxic materials which are evolved in the duodenum becomes more clear, the tendency among surgeons is to become more radical, and to feel that the mere mechanical relief of the obstruction is not enough, but that an attempt should also be made to drain these toxins from the upper bowel.

Stone[1] calls attention to the characteristics of this toxin. It is formed in the lumen of the bowel, and absorbed only by damaged mucosa. If fed to normal dogs no ill effects are noted. Its formation is independent of food products and the secretions of the liver, pancreas, and stomach. Bacterial growth is probably a factor in its production, but there is some doubt on this point. In chemical structure it is probably a proteose and arises from a splitting of the proteins present. The effect of this toxin when injected hypodermically is to bring about a train of symptoms very similar to acute obstruction. "Fall in blood-pressure, temperature disturbances, vomiting, diarrhœa, disturbance of kidney excretion, high non-protein nitrogen (Louria[2]), delayed coagulation-time of the blood, profound congestion of the duodenal mucosa, collapse, and death" make up the symptom-complex.

Most surgeons have now recognized these facts and act accordingly, but some are more radical than others. Collins[3] and Summers[4] advocate enterostomy in all severe cases, and make the opening as high in the jejunum as possible, irrespective of the location of the obstruction. Theoretically, of course, this is ideal, as this is the portion of the bowel where the toxic material is elaborated. As to the practical results, the method has not yet been given a sufficient trial to speak with certainty, but so far the results have been excellent. Boit[5] approves of the Moynihan tube, and has gone farther and devised a suction and lavage apparatus on the same principle. Upjohn[6] uses the Moynihan tube at times, but in the severer cases makes an enterostomy above the obstruction. [It seems to the reviewer that in the matter of conservatism the shock entailed in the making of an enterostomy is not nearly as great as in the extensive handling of already damaged viscera which is needed to perform any sort of an intestinal intubation. However, the difficulty of handling the high stoma may be great. Many of them do not close spontaneously, and as long as they are open the loss of nourishment, and especially of fluids, is very great and emaciation is rapid. If a second operation is necessary, it is very hard to choose the most auspicious time. We must wait until the shock of the first is past, and cannot wait too long, as the emaciation is so rapid that the patient is soon unable to withstand another operation.—E. W. A.]

On the other hand, a series of cases with a surprisingly low mortality is reported by Flint,[7] who has not made it a practice to open the upper intestine except in the very severest cases. In 282 operations the mortality was 15·6 per cent, which is very much lower than usual. He lays great stress on the post-operative treatment. The principles of anoci-association are acted upon. Free use of **Normal Salt Solution** is important. If it is not absorbed in the rectum, it should be given hypodermically; 5 per cent glucose may be added. **Morphine** is given regularly in small doses. **Pituitary Extract** is useful. For the last ten minutes of the operation the patient breathes pure oxygen, and it is suggested that the continuation of this later might be of value.

Tuberculosis of the Intestines.—This affection is divided by Caird[8] into two types. The first is the commonest, and is due to an enterogenous infection, usually from swallowing tubercle bacilli in pulmonary phthisis. Extensive ulceration of the lower ileum marks this type, and marked diarrhœa results. The lesions are destructive and no new tissue is formed. The outcome is early death. The diagnosis of this condition is easy, as it occurs in about 50 per cent of all people dying of lung tuberculosis.

The second type is not so common, and its diagnosis is very difficult. There is usually little if any sign of tuberculosis elsewhere. Infection occurs through the blood or lymph-stream. Not the mucosa, but the outer walls of the bowel are involved, and ulceration only occurs secondarily. As a consequence diarrhœa is absent and no bacilli are found in the stools, which may be quite normal. The lesion is hyperplastic and formative rather than destructive, and large masses are formed, gradually occluding and obstructing the lumen of the bowel. The neighbouring lymph nodes are often enormously enlarged. The treatment is mechanical. Usually the only indication for surgery is obstruction. If possible the diseased area may be excised; but as this is often impossible owing to the dense mass of adhesion all over the abdomen, we often have to resort to short-circuiting operations. The death-rate is high after operation, 25 per cent or over (Aimes[9]), but is 100 per cent without operation. Wilensky[10] advises the use of lateral anastomosis in all cases where resection is done, and is much opposed to the use of any drainage. In such a case drainage is of no value, as the material is not so infectious but that the peritoneum can easily take care of it, and drainage is very frequently followed by fistula formation. These fistulas, and also those which are formed spontaneously, should not be operated on unless there is definite evidence of obstruction, as they tend to heal spontaneously. (*See also* TUBERCULOSIS.)

REFERENCES.—[1]*Surg. Gynecol. and Obst.* 1921, May, 415; [2]*Arch. of Internal Med.* 1921, May, 620; [3]*Minnesota Med.* 1921, iv, 9; [4]*Surg. Gynecol. and Obst.* 1921, May, 412; [5]*Arch. f. klin. Chir.* 1920, cxiii, 921; [6]*Med. Jour. of Australia*, 1920, Oct. 9, 353; [7]*Brit. Med. Jour.* 1921, i, 729; [8]*Edin. Med. Jour.* 1921, Feb., 43; [9]*Rev. de Chir.* Paris, 1920, lviii, 177; [10]*N. Y. Med. Jour.* 1920, Nov. 13, 768.

IRIS, AFFECTIONS OF. (*See* EYE AFFECTIONS, GENERAL.)

JAUNDICE, EPIDEMIC INFECTIOUS.

Herbert French, M.D., F.R.C.P.

The reports of jaundice, fatal occasionally, the occurrence of which has been ascribed to syphilis or the administration of the arsenobenzol compounds, have led Stokes and Ruedemann[1] of the Mayo Clinic to analyze and record their experience of this complication. As a result of this, their present belief is that, while antisyphilitic treatment may have a predisposing influence, during the last two years it has been of minor importance, and that the major or exciting cause may be an infection of unknown etiology—possibly a tardy manifestation of epidemic influenza. From August, 1916, to July, 1920, 5200 patients with syphilis were under their observation, and 70 of these, or 1·3 per cent, developed jaundice. Their series falls into two periods of two years each. During the first not more than 6 cases were observed, but during the second (August, 1918, to July, 1920) 64 cases occurred. Meirowsky at the Cologne Clinic prepared statistics based on 225,780 injections: in these jaundice occurs once in each 2000 injections (0·89 per cent) of arsenobenzol, and once in 6000 injections of neo-arsenobenzol. Even on the basis of these figures the incidence of jaundice during the second period should not have exceeded 14, so that the abrupt occurrence of 64 cases suggests the operation of some factor other than arsenobenzol, the method of administration of which has remained constant or possibly been improved. The drug itself would appear to be exonerated by the fact that the same preparation has been used throughout, and that no other manifestation of increased toxicity has been associated with the jaundice throughout so long a period of observation. The 70 patients who exhibited jaundice included examples of every aspect of syphilis. Only 9 had palpable livers; 61 showed Wassermann's reaction weakly or strongly positive. No distinct relation between the jaundice and local infection could be demonstrated in the 58 who were examined for accessible foci of infection, although two-thirds of these had moderately septic teeth or tonsils. Five patients from whom dental or tonsillar foci had been removed developed jaundice. In 65 the prodromal period was two weeks or less; in 7 it was three weeks, and in 5 thirty days.

Coryza, tonsillitis and pharyngitis, and symptoms of influenza were a feature of the prodromal period. Aching pains and stiffness in back, shoulders, and legs were much complained of, while dizziness, drowsiness, and epistaxis also occurred. The symptoms at the height of the attack were those of the prodromal period, gradually decreasing during the early days of the jaundice. This was slow to depart: the average duration was thirty-seven days, and varied from a slight tinge to the most intense icterus. Unfortunately the state of the liver was recorded in only 27 cases, in 47 per cent of which a definite diffuse enlargement was noted. Fever was seldom seen. The stools varied from white in one case, clay colour in the majority, to normal in three cases. Bile was usually present in the urine. Four of the patients who developed jaundice had not syphilis.

The greater proportion of jaundice occurred between October, 1919, and April, 1920, with peaks in November and February. This period included the second wave of epidemic influenza. Little or no jaundice occurred in the epidemic of 1918.

Numerous cases of epidemic jaundice have been reported. Guiteras described an epidemic in Barbados in 1919. In Japan and Flanders the epidemic was spirochætal, while in Egypt and Gallipoli the paratyphoid bacillus was the causative agent. Lindstedt[2] in 1919 gave a series of 8 cases of a non-spirochætal and apparently infectious jaundice, and Tooth and Pringle[3] report the epidemic of catarrhal jaundice, which numbered 111 cases, among the British troops in Italy. The causative organism of the non-spirochætal types has not been demonstrated, but the authors suggest that epidemic infections such as influenza create widespread states of hyper-susceptibility, which result in the breakdown of tissues subjected, as is the liver in antisyphilitic treatment, to therapeutic strains which are ordinarily borne without reaction. They consider that a relatively small proportion are syphilitic and arsenical in origin, but that antisyphilitic treatment is in the great majority only predisposing, while the real cause of the great excess of cases of jaundice is the intervention of an extraneous and probably infectious factor.

REFERENCES.—[1]*Arch. of Internal Med.* 1920, Nov., 521; [2]*Deut. med. Woch.* 1919, xlv. 434; [3]*Lancet*, 1919, ii, 248.

JAUNDICE, INFECTIVE.

Sir Leonard Rogers, M.D., F.R.C.P., F.R.S.

J. A. Ryle[1] records a full clinical description of this disease based on 55 cases in his wards on the Western front during the war, where it was associated with wet trenches, and with rats showing a high percentage of infection. The diagnoses were made clinically, and in 23·6 per cent they were confirmed by animal experiment. The following are the percentages in which the most important signs were present. Albuminuria 58, acetonuria 16, herpes labialis 43·6, hæmoptysis 29, epistaxis 16, conjunctival injection 40, vomiting 76, abdominal pain 12·7, limb pains 43·6, and jaundice 72·7. The onset is usually sudden; the fever rises for about three days, and falls by lysis by the tenth day, with a tendency to small recrudescences or relapses in 18 per cent; the pulse is relatively slow, with an average maximum during fever of 100, and bradycardia during convalescence; the spleen is not enlarged clinically or post mortem; and the prognosis is good, only 5·4 per cent dying. No drugs showed any specific effect, salvarsan failing to influence the progress, but **Alkalis** appeared to benefit the patients.

REFERENCE.—[1]*Quart. Jour. Med.* 1921, Jan., 140.

JAW, BONY ANKYLOSIS OF.

Sir W. I. de C. Wheeler, F.R.C.S.I.

Carr[1] feels that the operation for bony ankylosis of the jaw is one of the most satisfactory in surgery. He draws attention to some of the difficulties of the operation, and follows the technique described by Murphy from time to time in the Murphy Clinics of Chicago. After mentioning the dangers of the operation in inexperienced hands, he says the following points should be noted :—

1. The temporal artery can be felt and located and the vertical incision made just anterior to it.

2. The horizontal arm of the incision may be made along the lower border of the zygoma instead of the upper border, as recommended by Murphy, and still be above and parallel to the main temporofacial branches of the seventh nerve, and may be carried down to the bone with one sweep of the knife. No important structure will be cut.

3. To get one's bearings, make a careful dissection at the anterior end of the horizontal limb of the incision, drawing down the wound until the anterior border of the ramus can be felt and freed sufficiently to get a Murphy retractor under it (*Fig.* 48).

4. The parotid gland in all his cases projected over the ramus almost, or quite, to its mid-line, and can hardly be distinguished from the fat and connective tissue lying in that region. In my first four operations I injured or cut into it three times, with a salivary fistula as the result. Although these fistulas all healed spontaneously in from three to eight weeks, they were very annoying, and necessitated frequent re-dressings.

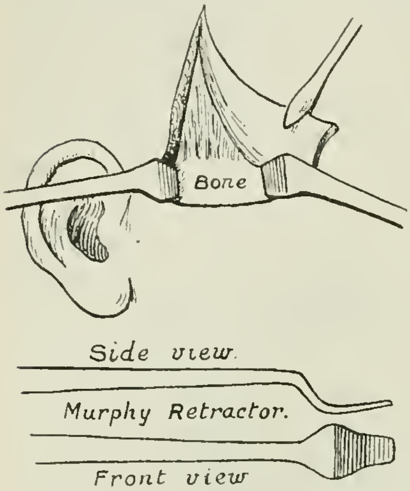

Fig 48.—Shows the bone exposed and isolated by the Murphy retractors.

5. The bone is then found to be completely isolated in the region to be divided by boring a chain of $\frac{5}{8}$-inch holes through it with the author's cranial drill and connecting them with a gouge chisel, cutting away the bone as shown in the dotted lines in *Fig.* 49.

The bone should be gouged out without hammering, and this can be easily done if the holes are bored close together. This can be accomplished more easily and more quickly than division with a Gigli or other saw, and allows a shaping of the bone as indicated by the dotted lines in *Fig.* 49. It also takes out a thicker section of bone than a simple saw cut, and this is a good thing in preventing pressure on tissue interposed between the cut ends. He is opposed to the use of a chisel and mallet upon the skull, particularly the base of the skull, near the mastoid and maxillary articulation. We all know how easily one may be knocked out by a slight blow on the chin, and cases of severe and even fatal shock follow a vigorous use of the mallet and chisel.

By the use of the Murphy incision and the careful dissection above recommended, the facial nerve will not be injured and bleeding will be avoided, as well as the danger of injury to the parotid or Stenson's duct.

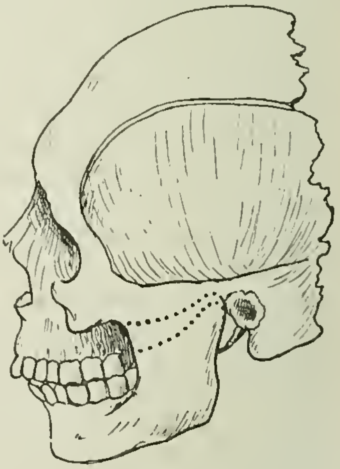

Fig. 49.—Shows the solid ankylosis and total lack of any line of demarcation between jaw and skull. Dotted lines show the bone to be cut away, leaving a rounded point for articulation.

Figs. 48 *and* 49 *redrawn from the 'Annals of Surgery'.*

In most cases where the affection is one-sided, the mouth will open readily after division of the bone, even when the case is of long standing.

REFERENCE.—[1]*Ann. of Surg.* 1921, March, 314.

JOINTS, SURGICAL AFFECTIONS OF. (*See* ORTHOPÆDIC SURGERY.)

KALA-AZAR.

Sir Leonard Rogers, M.D., F.R.C.P., F.R.S.

ETIOLOGY.—E. H. B. Fantham and Annie Porter[1] describe a new herpetomonas found in the blood and tissues of the silver-fish, and refer to their experiments in infecting all classes of vertebrates by inoculation and feeding with herpetomonads, and the natural infection of various vertebrates with this class of protozoa. They point out that leishmaniases are pathogenic infections of vertebrates by herpetomonads which are natural parasites of invertebrates such as insects.

J. E. R. McDonagh[2] has studied Leishman-Donovan bodies in cutaneous forms of leishmaniasis, and suggests that they represent an asexual cycle of a coccidial protozoon closely similar to that which he has described in syphilis.

DIAGNOSIS.—R. Knowles[3] failed to get good results with Cornwall's method of cultivating Leishman-Donovan bodies from the peripheral blood, while Row's method gave only occasional good results. Night blood examinations corresponded with day ones, and dark-ground illumination of fresh blood failed to show moving forms. The following method, however, greatly increased the positive findings. One c.c. 1–1000 liquor adrenalin is injected in an adult, and half an hour later six good films with a smooth, even leucocyte edge and tail are made, the chances of finding the parasites in the peripheral blood-films being thus greatly increased.

Napier,[4] special kala-azar research worker in the Calcutta School of Tropical Medicine, has discovered a promising blood test for the diagnosis of that disease, which gave positive results in all but one of fifty proved cases of kala-azar. It is a modification of the formal-Gel test for syphilis, in which the blood serum becomes jellified in twenty-four to thirty hours when two drops of commercial formalin solution are added to 1 c.c. of clear serum. In the case of kala-azar an immediate white opacity develops, and the serum jellifies within half an hour. The test is negative in malaria and in most cured cases of kala-azar.

F. P. Fox and F. P. Mackie[5] have independently arrived at the same conclusions.

TREATMENT.—R. Knowles[3] reports further on the effects of a course of 200 cgrm. of **Tartar Emetic** in 1 per cent solution intravenously over three months, which ensures a negative spleen puncture and gives good results.

J. H. Wylie,[6] in North China, deals with 35 cases of kala-azar, in 15 of which the diagnosis was verified by spleen puncture. In 7 cases treated by splenectomy 3 died, 2 were cured, and 2 relapsed. With tartar emetic in 18 cases 44 per cent were cured, 26 per cent were greatly improved, and 17 per cent died.

REFERENCES.—[1]*Jour. of Parasitol.* 1920, vii, 16; [2]*Brit. Jour. Dermatol. and Syph.* 1921, May, 182; [3]*Ind. Med. Gaz.* 1921, 145, and *Ind. Jour. Med. Research*, 1920, viii, 140; [4]*Ind. Med. Gaz.* 1921, Sept., 388; [5]*Ibid.* Oct., 374; [6]*China Med. Jour.* 1920, 593.

KELOIDS AND CICATRICES.

E. Graham Little, M.D., F.R.C.P.

Ahlswede[1] tried some experiments in softening keloids and scar tissue of burns by compresses soaked in the following solution: **Pepsin** 10 gr., **Hydrochloric Acid** 1 c.c., **Phenol** 1 c.c., **Distilled Water** to 200 c.c., applied under impermeable dressings. The same compresses were tried also over infective enlarged glands, e.g., in soft chancre and in tuberculosis, with apparently satisfactory results.

REFERENCE.—[1]*Arch. of Dermatol. and Syph.* 1921, Feb., 142.

KIDNEY FUNCTION TESTS.

John D. Comrie, M.D., F.R.C.P.

An increasing amount of general interest is being taken in tests for the estimation of the functional power of the kidneys, and in the past year discussions upon this subject have been held at meetings of the British Medical Association, of the British Association, and of the Royal Society of Medicine. The general result has been to narrow the inquiry down to a few tests suitable for clinical purposes, discarding those which are of doubtful value or of complicated technique.

Thus the co-efficient of Ambard, which for some years has been used by French investigators as a measure of renal efficiency, has fallen largely into disuse, and its inherent unsuitability is indicated by Maclean.[1] The diastase test, in which the amount of amyolytic ferment excreted in the urine is estimated, has also been generally abandoned, because its results are vague, and the limits of excretion of the ferment do not greatly differ in healthy persons and in nephritics. Indeed, as pointed out by Langdon Brown[2], in certain cases of toxic nephritis the diastase output may be much higher than in health.

Water and Chlorides.—Leathes[3] places reliance upon a test in which the urine is collected at hourly periods twice before and four times after drinking 500 c.c. of water at 8.0 a.m. The patient is kept in bed during these six hours and is not allowed to eat or drink anything further till the six specimens have been collected. The specimen showing maximum diuresis is chosen, and is compared with the hourly output during the night period, as regards water-content and alkalinity. In the normal subject the water passed was found to be on an average 6·5 times as much during this hour of maximum diuresis as during an hour at night; while in the nephritic it varied from 4·1 down to 1·8 times as much, being less in proportion to the severity of the case. The alkalinity in the normal subject was, during the hour of maximum diuresis, 80 per cent of the night-urine alkalinity. In nephritic cases it sank to 73 or even 36 per cent of the alkalinity during the night, being lowest in the severest cases. The diuresis was always accompanied by an increased output of sodium chloride.

A similar test is recommended by John,[4] which is simpler in clinical practice. The patient drinks at about 8.0 a.m., fasting, 1½ litres of water or weak tea; thereafter he passes water into a series of separate glasses every half-hour for four hours. He must remain in bed and without any food or drink for this period. The quantity and the specific gravity of each of the eight specimens are measured. In normal people the water that has been drunk is all excreted in the course of two to three hours with a very low specific gravity (1002 to 1001); indeed in neurasthenic persons with healthy kidneys a greater amount may be passed in this time than the 1½ litres originally ingested. In cases of disturbed renal function, on the other hand, there is a delay of diuresis for four hours or more, and then a prolonged excretion of fairly equal amounts over several hours, the specific gravity never being greatly reduced.

Boyd and Malcolm Smith[5] investigated the value of this type of test by comparing the amounts of night urine (i.e., 9.0 p.m. to 7.0 a.m.) and of day urine. In the healthy person, the total amount passed during the night period of ten hours is little if at all greater than that passed in any space of two hours throughout the day period of fourteen hours. Further, if the healthy person takes food or drink, the extra fluid is excreted as urine almost at once. In the nephritic person, speaking generally, there is a tendency to 'fixation' of the kidney output, so that the amounts in successive two-hourly periods tend to be similar both night and day, and whether extra fluid is taken or not. If this were a uniform characteristic in all cases of nephritis, these investigators point out that the test would be a most valuable clinical means of estimating kidney function, because of its simplicity. Unfortunately, however, this is not constantly the case, for they have frequently found that well-marked cases of nephritis, even of the interstitial form, show a rate of excretion conforming to the healthy type. The test, therefore, is not reliable.

Willcox[6] considers that insufficient stress has been laid on the amount of chlorides in the urine, which are especially diminished in parenchymatous nephritis ; when they fall below 4 per cent he considers that one can anticipate renal damage and loss of function.

Blood Examination for Urea.—The estimation of the amount of blood-urea as a preliminary inquiry has been recommended by MacLean (*see* MEDICAL ANNUAL, 1921, p. 275), and confirmed by further experience.[7] The normal amount—viz., about 20 to 30 mgrm. per 100 c.c. of blood—may be present in mild cases of nephritis, but it has been found by Comrie[8], as the result of examining a large number of nephritic cases, that 50 mgrm. of urea per 100 c.c. of blood may be taken as of serious import, and that cases showing 100 mgrm. or more rarely recover, and, except in the case of children, usually reach a fatal issue within a year or thereabout. Thomson Walker,[9] in reference to examination of the blood in surgical cases, considers that an increase over 40 mgrm. per 100 c.c. of blood may be taken as indicative of uræmia ; and that in urinary surgery the cases in which this examination is most useful are those in which it is already known that the kidneys are damaged but complications arise which may be ascribed to other causes as well as to uræmia. Dobson,[10] in prostatic cases with increase of blood-urea, recommends preliminary suprapubic drainage, and delay of prostatectomy till the blood-urea is within normal limits.

Urea Concentration in Urine.—This test consists in administering a large dose (15 grm.) of urea by the mouth, and observing the power possessed by the kidneys to excrete it in high concentration and at a rapid rate. In normal persons, at two hours after such a dose, the percentage of urea in the urine rises to 3·5, 4, or more, while the nephritic passes it in a concentration of 2, 1·5, or less per cent. The test has been discussed in the MEDICAL ANNUAL, 1921, p. 275. Swift Jolly,[11] criticizing this test as an indication for advisability of operation in 64 cases of enlarged prostate, came to the conclusion that it yielded some information, but that since a low urea concentration was often accompanied by diuresis, the total quantity of urea excreted during the second hour after the dose of 15 grm. gave a better indication of the renal efficiency than the percentage. Weiss[12] considers the urea-concentration test a valuable one in prognosis, and notes a close parallelism between the findings of this and of the phenolsulphonephthalein test, especially when the figures of both are low. Blodgett[13] uses this test to determine the ability of the kidney to excrete waste products, and so to control the amount of protein diet that is suitable for the case.

Phenolsulphonephthalein Test.—This test continues to stand high in favour with most of those who have dealt with renal function tests, though there has been some criticism of the factor of interference by high-coloured urine. Pedersen[14] has carried out an elaborate series of colorimetric experiments with urines of various tints containing known quantities of the pigment in various dilutions. He comes to the general conclusion that, to obtain an absolute reading of the amount of dye excreted when the amount of this is about normal, one should, if the urine is pale yellow, deduct 10 per cent from the colorimeter reading; if the urine is deep yellow, deduct 15 per cent; and if it is reddish, deduct 20 per cent. It may, however, be pointed out that this disturbing factor can be largely eliminated, as regards yellow coloration, by the use of a filter of coloured glass introduced below the prism of the colorimeter.

The value of this test is endorsed by Sir J. Thomson Walker,[15] who considers it the best of all colour tests, and, except where the urine contains blood or bile, has had no difficulty in estimating the percentage of the dye in the urine with the simplest form of colorimeter. According to Everidge,[16] it gives 66 per cent of accurate results, as controlled by other tests and clinical results, when it is used for preliminary investigation before operation (chiefly prostatectomy), and at least 54 per cent of accurate results when used as a test of relative kidney value. In 15 per cent of cases, however, he had found this test misleading.

Boyd[17] commends this test for the purpose of prognosis in cases of nephritis, but does not find that a low excretion of phthalein (18 or 19 per cent in two hours) shuts out the prospect of improvement. Comrie[18] considers the phthalein excretion test the most satisfactory individual test for prognosis in cases of nephritis, and one of considerable value in the prognosis of cardiac cases. He believes that if possible a series of two or three observations should be made at intervals of a few days rather than an estimation on one occasion only. In his opinion an accurate idea of the kidney function power can be reached by a consideration of the combined results of blood-urea examination, the urinary urea-concentration test, and the phenolsulphonephthalein excretion; and there is a close though not absolute parallelism between the urea-concentration test and the phthalein excretion. After some ten years' experience of the last-named test Comrie considers that the following deductions as to prognosis may justifiably be drawn: an excretion which takes place chiefly in the first hour, and in two hours reaches 70 per cent or over, gives (the presence of blood being excluded) a good prognosis; an excretion of 50 per cent for two hours, in either renal or cardiac cases, is compatible with complete restoration of health and working capacity; an excretion of 30 per cent is compatible with prolonged life, though on a low plane of vitality; when the excretion does not rise above 20 per cent, in spite of treatment, death within a year may be expected.

Other Tests Proposed.—The estimation of the renal concentration power for uric acid is proposed by Higley and Upham.[19] They point out that the amount of uric acid in the blood is not proportional to the kidney inefficiency; for the former may be very high when the kidney is excreting uric acid at a normal rate. It is necessary, therefore, in order to compare different cases, to state a co-efficient, which is obtained by dividing the amount of uric acid per 100 c.c. of urine by the amount of uric acid per 100 c.c. of blood. The normal co-efficient lies between the figures 2·4 and 4·7. This is markedly reduced in cases of interstitial nephritis, even at a very early stage, and these writers therefore believe that the test is of great value as giving early warning of the necessity for dietetic and other treatment.

A hippuric acid synthesis test is proposed by Violle[20] for the estimation of renal function. The normal daily secretion of hippuric acid is about 0·4 grm.; and if 0·5 grm. of glycocoll and 0·5 grm. of benzoic acid be administered by the mouth to a healthy person, the elimination for the next twenty-four hours is raised to about 1·14 grm. If the collected urine of twenty-four hours following this dose shows a marked falling short of 1·14 grm., say only 0·4 or 0·5 grm., a depressed renal function is indicated.

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KIDNEY, SURGERY OF. (*See also* Ureter.)

Sir John Thomson Walker, F.R.C.S.

In an editorial[1] on *absorption through the genito-urinary organs*, attention is drawn to experimental work by Macht on the absorption of local anæsthetics. Local anæsthetics, like cocaine and its analogues, are easily absorbed through various organs of the genito-urinary tract with the exception of the bladder. Macht urges that the absorption of cocaine through the ureter and pelvis of the kidney is of importance in view of the modern use of such drugs as the iodides and thorium.

Van Vlaten[2] compares *indican and the urea content of the blood serum* of 40 patients in different diseases to demonstrate the variations with diet and other factors and the importance of hyperindicanæmia in prognosis. The normal range varies from 1·4 to 1·8 mgrm. per litre. The urea and the indican content do not run parallel, although where there is uræmia there is usually indicanæmia, and in one case it developed before the uræmia.

Braasch[3] states that *pyelography* is contra-indicated in patients of advanced age or those greatly emaciated, cases of advanced bilateral renal disease, and those in which no benefit will be received by treatment. Iodides and bromides are the media more generally used, and although they are comparatively harmless they must be employed with care. The medium should be introduced by gravity, and removed as completely as possible from the kidney pelvis after the *x*-ray exposure. Usually 5 c.c., or at most 10 c.c., will be found sufficient. The diagnosis of hydronephrosis can usually be made without a pyelogram by withdrawing the fluid from the kidney pelvis. The interpretation of the pyelogram in these cases may be difficult because of impassable obstruction at the ureteropelvic junction, or dilution of the medium by retained fluid, or because the amount injected is insufficient to fill the pelvis completely. In renal neoplasm the pyelograms often resemble those obtained in polycystic kidneys, though retraction and narrowing of the calices are noted. A polycystic kidney frequently has an abbreviation of one calix or more, and seldom any narrowing. The chief value of the pyelogram in nephrolithiasis lies in the identification of the shadow, which otherwise might be confused with extrarenal shadows.

Cope[4] discusses subacute *perinephritic abscess of non-renal origin*, and gives a summary of 13 cases. The common organism was the *Staphylococcus aureus*. Of 12 abscesses, 8 contained a staphylococcus, 3 a streptococcus, and 1 a bacillus of undetermined nature. The sources of the infections were classified in two groups: (1) Metastatic cases following a suppurative process elsewhere in the body, especially whitlows, carbuncles, or boils; (2) Those associated with or consequent on dysentery or diarrhœa. There was a stage of general symptoms, and a stage of local symptoms and signs, when the diagnosis was usually easy.

In a paper on *infections of the kidney*, Cabot[5] disagrees with the view that cystitis may be a primary infection and that infection of the kidney or pelvis may be ascending. Infectious diseases of the kidney may be classified according to the properties of the organisms causing them.

In the first group are the *Staphylococcus* and the *Streptococcus pyogenes*, and various bacilli, but the first two are most common. These organisms produce lesions close to the renal cortex because they cannot pass further through the kidney. Circumscribed areas of suppuration are produced which do not spread through the kidney but cause perinephritis and perinephritic abscess. The urine may be normal throughout the whole course of the disease, but organisms may be isolated on culture. There is fever of the septic type and enlargement of the kidney. The treatment is surgical, either nephrotomy or nephrectomy being carried out.

The second group is due to bacilli of the colon-typhoid group. These constitute the majority of kidney infections. Pyelitis results, but only after there has been a low-grade infection of the kidney producing a cloudy swelling which rapidly clears up. The effect of the organisms on the kidney function is very striking, and different from that produced by the coccus infection. The latter involves chiefly the cortical area and does not materially lower the kidney function. The colon bacilli, however, produce a diffuse process through the secreting portion, and give rise to a functional disturbance, lasting only two or three days, after which the function again increases.

The third type is produced by the streptococcus, which affects primarily the glomerulus. There is usually no change in the urine at any stage. In Cabot's experience there is no way of diagnosing acute glomerulonephritis.

Strominger[6] discusses *urinary complications of typhus and recurrent fever* that he observed in the Roumanian campaign of 1916–18. From these cases he draws the conclusion that the kidney is comparatively frequently, and the bladder very frequently, involved. The resulting condition is more of the nature of a toxic and vascular than an infective change. The late appearance, the absence of bacteria and of inflammation, and improvement without vigorous local treatment, all point to a toxic cause. The post-mortem examinations show intense vesical lesions, with gangrene of the mucosa and submucosa, and renal lesions.

In discussing *pain in kidney disease*, Cecil[7] states that of 67 cases of calculus in the kidney, 21 presented typical renal pain in the region of the superior lumbar triangle radiating along the course of the ureter, 19 (28 per cent) presented pain in the abdomen alone, without pain in the back. When the pain was present in the lower abdomen, it occurred in the neighbourhood of McBurney's point when on the right side, and in the corresponding position when on the left side. In 26 cases pain in the back was associated with pain in the abdomen., In 13 of the 67 cases of stone in the kidney and ureter, various surgical procedures had been undertaken for the relief of pain in which the symptoms were in no way changed. There were 9 appendicectomies, 1 operation on the epididymis, 2 abdominal explorations, 1 gall-bladder drainage, 1 removal of right ovary. In only 2 of these 13 cases was the urine negative ; in the remaining 11 there was blood in 8, pus in 10, albumin in 7, and infection in 4.

Taylor[8] describes a case of *nephrolithotomy in a horseshoe kidney.* The congenital malformation was not discovered before operation, although a double pyelogram was made. Two operations were performed. At the first the kidney was exposed by a lumbar incision and the diagnosis established, and at a second operation, two months later, the kidney was exposed by a transperitoneal route through an anterior incision. "If a horseshoe kidney is encountered upon lumbar operation and moderate efforts fail to dislocate it, it is advisable to defer further efforts rather than make an enlarged and mutilating incision." [This dictum will hardly recommend itself to the surgeon of even moderate enterprise.—J. T. W.]

Sachs[9] records the result of treatment in a number of cases of *cystitis and pyelitis* with intravenous injection of **Neosalvarsan** and **Urotropine.** With neosalvarsan there were 3 cases cured, 2 cases improved, and 11 unchanged. With intravenous urotropine there was cure in only one case, and in one case treated by neu-urotropin. No result followed in 10 cases treated with urotropine and with neu-urotropin.

Bier and Hyman[10] base a study of *progressive nephrectomy* on a series of 207 cases performed at the Mount Sinai Hospital since 1914. The operations were performed by a group of three surgeons, and showed a mortality of 3·8 per cent; whereas 112 nephrectomies performed by a number of surgeons at the same hospital prior to 1914 had a mortality of 21·22 per cent. The improved result was attributed to a number of factors, the most important of which was "the careful and exacting pre-operative study to which every urologic case is subjected". These examinations include urinalysis, röntgenography, phenolphthalein test, cystoscopy, and ureteral catheterization combined with indigo carmine, as a test of individual renal function, wax-tipped bougies, pyelography, blood-chemistry, and blood-pressure estimation. Advances in operative technique, aided by the concentration of similar cases, have helped, and the earlier recognition of serious renal disease by the general practitioner has been of value. In almost all cases except the very large neoplasms, the lumbar approach was employed; in very large neoplasms, the transperitoneal route through a vertical incision was used.

Battle[11] records a case examined five years after the establishment of *permanent drainage of the only kidney.* An operation had been performed for double uterus with retention of the menses in the closed half, and a vesicovaginal fistula had followed. Battle drained one renal pelvis which was found distended with purulent urine. After that no more urine came from the bladder, and it was found that the patient had only one kidney. Eventually a silver flanged tube was used instead of a rubber one. The author prefers nephrostomy or nephrotresis to ureterostomy in cases where permanent drainage of a kidney is necessary, because of the absence of contraction of the fistula and the ease of application of a drainage apparatus.

RENAL TUBERCULOSIS.

Van Rijssel[12] throws doubt on the usual guinea-pig test for tuberculosis of the urinary tract. Four kidneys removed on a diagnosis of tuberculosis failed to show tubercle on microscopical examination. In these cases the diagnosis had been based on inoculation of guinea-pigs. The animals may have been tuberculous at the time of inoculation. In 2 cases non-malignant tumours of the kidney caused the symptoms, and in 2 others the kidney was normal but there was a slight apical tuberculous process.

In discussing the diagnosis of tuberculosis of the kidney, Eisendrath[13] divides the cases into six types, according to the onset of the disease: (1) Those in which the symptoms of cystitis predominate; (2) Those in which the first symptom is hæmaturia; (3) Those in which the symptoms point directly to the kidney, or both renal and vesical symptoms are combined; (4) Those in which the onset is acute, and characterized by chills, fever, and local symptoms resembling those of ordinary pyogenic infection of the kidney; (5) 'Silent' cases in which the loss of weight and strength, and indefinite lumbar or abdominal pain, are usually associated with the presence of a tumour in the region of the kidney; (6) Those in which the appearance of a perinephritic abscess is the first symptom.

Braasch[14] discusses *occluded renal tuberculosis*, and formulates the following conclusion. Renal occlusion occurs in about 10 per cent of the cases of chronic renal tuberculosis. It can be recognized by means of clinical, *x*-ray, and cystoscopic data in fully 90 per cent. The usual symptoms are persistent frequency, dull pain, or abdominal tumour, usually extending over a period of many years. The occluded kidney may be a focus of infection if the occlusion is of recent occurrence. If it has existed for many years, it is usually sterile. In the presence of persistent frequency, dull pain, or abdominal tumour, nephrectomy is indicated. The post-operative results are usually excellent, with recovery from the various symptoms. In cases of bilateral tuberculosis the removal of an occluded kidney will not benefit the patient, and operation should not be performed.

Brady[15] deals with the final result of surgical treatment in 77 cases of tuberculosis of the kidney in women. Of these cases 71 per cent were between the ages of twenty and forty years, and the average duration of symptoms was thirty-three months. Of 7 cases not operated upon, 4 are known to be dead, and the other 3 left the hospital in a very bad condition and are possibly dead now. Three cases of simple nephrotomy all did badly. The ultimate result was known in 42 out of 67 cases in which the kidney was removed. Of these, 7 are greatly improved and are alive six years after operation ; 25 are entirely well after an average period of eleven years (59·5 per cent). Comparison of the results obtained when the ureter is removed with the kidney, and when it is left *in situ*, shows that although the ultimate results following the two methods are the same, the first operation sinus heals more rapidly when a nephro-ureterectomy is done.

Thévenot[16] discusses tuberculous perinephritis following nephrectomy for renal tubercle. Total tuberculous perinephritis is rare. It may appear a few days after the operation, or the elevation of temperature and the local signs may only appear on the tenth to the twentieth day. The inflammatory process commences in the depths of the wound, and spreads over the whole surface, forming soft, pale granulations and ulcerations. Gradually it approaches the surface, and eventually an extensive cavity is covered only by apparently healthy skin. This in turn is involved, and the wound opens and retracts. There is a continuous moderate temperature, no pain, and no general symptoms or local reaction. Rochet and Albarran hold that the condition is due to subcapsular nephrectomy, which leaves deposits of tubercle in the fatty capsule. Forceps left in the pedicle are also held responsible. In other cases direct infection of the wound with tuberculous material from rupture of the tuberculous kidney at the operation has been blamed, or a portion of tuberculous kidney tissue or a strip of the renal pelvis may be left behind in the clamp. Again, the upper end of a tuberculous ureter, when the ligature has become absorbed and allowed tuberculous material to escape into the wound, may be responsible. In spite of the apparent gravity, the prognosis is favourable. It is a very prolonged complication.

RENAL TUMOURS.

Pilcher[17] describes 6 cases of carcinoma of the kidney. Carcinoma may develop from the epithelium of the pelvis or from that of the renal tubules. "Its inception is apparently due to the presence of an irritating factor such as stone, infection, or stasis." There appears in all cases examined some area of inflammation. "The neoplastic tissue seems to develop not at the point of irritation but peripheral to the round-cell inflammatory reaction, one process merging into the other." Cystoscopy is essential in every case of hæmaturia to ascertain the source of the bleeding. Exploratory operation should be made, if possible.

Forty cases of renal tumours were observed by Hyman[18] in seven years, 28 of which were hypernephromata, 8 mixed tumours, 2 adenocarcinoma, 1 papilloma of the renal pelvis, and 1 angeioma of the renal pelvis. In hypernephroma there is a tendency to form a single metastatic deposit. The author holds that a single metastasis, readily accessible and where no cachexia is present, should not contra-indicate radical operation. The kidney should first be removed, and as soon as possible followed by excision of the secondary growth. Albrecht has reported some cases where patients lived for years after the removal of a secondary deposit. In one case nephrectomy was performed twelve and a half years ago ; three years later a metastatic tumour was removed from the scapula, and the patient was still alive nine years later. It is advisable before operating to radiograph all the bones and the lungs to exclude metastasis.

In 28 cases operated on, nephrectomy was performed on 20—by the lumbar route in 16, and by the transperitoneal route in 4. In 8 cases operation showed an inoperable growth. The renal vein contained thrombi 9 times. Of the 20 nephrectomies, 1 died (5 per cent) of uræmia ten days later, and the growth was found to have extended from one renal vein into the vein of the opposite kidney. One of the 8 exploratory operations was fatal six days later from general weakness. Of the surviving patients, 9 died within the first year and 5 in the second year, from recurrence or metastasis. One patient was alive after six months, one after twelve months, one after three and a half years, two after four and a half years, and one after seven and a half years. In 6 cases data were unobtainable. In 3 patients who have survived over three and a half years, the kidney at the operation was densely adherent, and the growth had perforated through its capsule into the renal pelvis, while in the other 2 cases the renal vein contained thrombi of growth at the time of the operation.

McGlannan[19] discusses *carcinoma of the pelvis of the kidney*, and records a case. Practically all tumours of the renal pelvis have a papillary structure, and are benign at first. There is a marked tendency to malignant change. When infiltration takes place, it spreads into the parenchyma of the kidney as a medullary or schirrhous carcinoma. Secondary growths in the ureter and bladder are produced by implantation. No definite relation can be traced between the development of papillary tumour and stone in the renal pelvis.

McCown[20] describes a case of *papillomatous epithelioma* of the renal pelvis, and found 38 similar cases in the literature. Both kidneys were involved in one case. Extension to the ureter or secondary growths in the ureter were found in 23 cases, and the ureteric orifice or bladder was involved in 17 cases. Hæmaturia was reported in 23 cases, and hæmaturia with renal colic in 12 cases, palpable tumour 14 times, abdominal pain 8 times, and frequency and painful micturition in 6. Hæmaturia is usually painless and intermittent at first, but becomes profuse and is sometimes accompanied by renal colic as the disease progresses. Examination by the *x* rays has not been of much value. **Nephrectomy** is indicated, and **Ureterectomy** at the same time or soon after.

In 58 cases of *carcinoma of the kidney* Rovsing (quoted by Michaelsson) found that 39·6 per cent remained well for four years after nephrectomy. Recurrences and metastasis took place even after six, eight, or ten years. The patients may be so old at the time of the operation that they die of other diseases before the results of the operation are definitely established. In 54 cases of his own, 35·19 per cent of the patients remained well after three years, while in 268 cases collected from the literature, 17·17 cases were reported cured. The histology of the tumour does not warrant definite conclusion in regard to prognosis.

Michaelsson[21] operated on 30 cases between 1896 and 1915. Of these, 7 are alive at intervals of fifteen, twelve and a half, nine, nine, seven, four and a half, and four years after the operation ; 4 died of the operation, 6 from recurrence during the first three years, and 3 after three years (1 ten years and 1 four and a half years after operation).

Holmes[22] records a case of *retroperitoneal perirenal lipoma* on which he operated. and discusses the literature. These tumours arise from the fat around the kidney and attain great dimensions, weighing in some cases from 40 to 70 pounds. They all contain fatty and fibrous tissues in different proportions, with usually more or less malignant degeneration. The first sign is an increase in the size of the abdomen. Pressure on the vena cava causes œdema of the legs, on the portal system ascites and dilatation of the subcutaneous veins of the abdominal wall, and on spermatic veins development of varicocele. Pressure on the nerve-trunks produces pain. Shortness of breath results from pressure on the diaphragm. Digestive symptoms develop, such as anorexia, distention, diarrhœa, or constipation. Intestinal obstruction is a rare complication. Diagnosis rests on the discovery of a large abdominal tumour of slow growth which is smooth, rounded, soft, semifluctuant, without mobility, extending into the flanks in the region of the kidneys. The colon may be percussed on the surface of the tumour. The tumour is enclosed in a fascial capsule, and enucleation can be performed without injury to important structures. The abdominal route has been preferred. The primary mortality is 20 per cent, and recurrence in a malignant form is common.

RENAL AND URETERIC CALCULI.

Keyes Jr.[23] discusses the problems concerning urinary calculi, and relates his experience in 80 operations for stone in the kidney and ureter. There are four ways in which a stone may be retained in the urinary channels: (1) The stone may adhere to its point of formation until too large to pass: (2) It may be irregular in shape; (3) It may lie in some part of the renal pelvis or bladder where it is not forced into the ureter or urethra; (4) There may be ureteral or urethral obstruction.

Six months appears to be the accepted time that the stone may be left in the ureter and still pass without permanent damage to the kidney. Keyes relates a number of cases that have remained longer. Ureteral stones should be operated on because of alarming symptoms, or because they do not descend, or because they are more than 0·5 cm. in diameter.

The author formulates the following rules for operation on bilateral stone:

1. The kidney showing the better function should be operated upon first.
2. The kidney showing acute symptoms is usually the sounder organ.
3. Impaction of stone in the ureter of the sounder kidney may temporarily reduce its function below that of its fellow; under such conditions it is safer to operate first upon the side with ureteral stone.
4. Simultaneous bilateral operation may be attempted if the patient's condition is relatively good and the first operation not unduly long (thirty minutes).
5. In an emergency such as anuria, the sole object of operation should be to provide drainage to the kidney.
6. Geraghty's formula—i.e., good concentration of urea and of phenolsulphonephthalein and a small quantity of urine—(with consequent low total phthalein—may be depended upon to indicate an atrophied or congenitally small kidney inadequate to support life. Keyes found 49 cases of bilateral stone in a total of 236.

Haines and Taylor[24] describe a case in which there was very sharp pain in the right lumbar region radiating to the groin, associated with frequent micturition, nausea, and vomiting. The pain was severe, with intermissions lasting for four days. After a week there was another attack lasting five days. There was marked tenderness over the right kidney, and there were multiple shadows in the left kidney, with a greatly diminished renal function. The left kidney was removed and the pelvis found dilated and full of small stones; the kidney showed chronic interstitial nephritis. Convalescence was rapid and uneventful, and a year later there had been no recurrence of symptoms.

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KUEMMEL'S DISEASE. (*See* SPINE AND SPINAL CORD.)

LABOUR, MANAGEMENT OF.

W. E. Fothergill, M.D.

Version.—The elimination of the second stage of labour by version continues to be a topic of interest, and its modern apostle, J. W. Potter,[1] has made another contribution to the subject. During the year before the date of his communication he personally delivered 1113 women, of which 920 were delivered by version, 400 being primiparæ and 520 multiparæ. In addition to the 920 versions there were 80 abdominal Cæsarean sections and 2 vaginal hysterotomies, 35 breech cases, and 39 instrumental deliveries. There were 41 still-births, due to the usual causes. Potter thinks that complications having to do with the cord are the most prolific cause of still-birth. Only two mothers died after version, one being a poorly-nourished patient with chronic colitis, who died forty-one days after delivery, and the other being a normal case, who acquired pneumonia when ready to leave hospital, and died of it a month after labour.

M. P. Rucker[2] reports 200 cases of version by the Potter method, some delivered by himself, some by his associate, Dr. Carter, and some by fourth-year students under his direction. There were 3 maternal deaths—one from post-partum eclampsia, one from the anæsthetic, and one from influenza. There were 12 still-births, 3 macerated fœtuses in the 12. Rucker is surprised at the few and insignificant lacerations which occurred in this series—7 perineal tears and 46 slight lacerations of the skin and vaginal wall at the vaginal orifice. He explains this freedom from injury as due to deep anæsthesia, the modified Walcher posture used, the preliminary stretching of the vagina by the hand, and the relatively small diameters opposed to the vaginal outlet by the after-coming head. Rucker says that, from the point of view of the infant, there is a great difference between version done at the end of the first stage of labour, and later, when some form of interference is imperative. Danger to the child seems to begin when the second stage of labour has gone on from half an hour upwards. He concludes that the Potter version can be taught to students, and that it is easier to teach than the use of the forceps. It protects the maternal soft parts from undue injury. In the interest of the child it should be done gently and deliberately. A competent anæsthetist is of the greatest importance.

Long discussions on this matter have again taken place at meetings of the American Association of Obstetricians and of the Obstetrical Society of Philadelphia. In closing one of these discussions, Dr. Potter, when asked if he advocated version for everyone, said he did not advocate it for anyone if they did not want to do it; but men trained in obstetrics should be able to do version just as well as Cæsarean section. It was for the professor of obstetrics to decide whether he should teach men to do version or not.

Potter's success in eliminating the second stage of labour seems to have raised the emulation of exponents of other methods. Thus J. B. De Lee[3], of Chicago, writes on the 'prophylactic forceps operation', which means the routine delivery of the child in head presentation as soon as the head has come to rest on the pelvic floor, and the early removal of the placenta. As soon as the pains are well established and the cervix opened 2 to 3 cm., the parturient is given $\frac{1}{6}$ gr. of morphine and $\frac{1}{200}$ gr. of scopolamine. An hour later $\frac{1}{400}$ gr. of scopolamine is given, a third dose being added occasionally. The room is darkened and quiet. Chloral and bromide may be given per rectum to aid the morphine, or gas and oxygen may be used by an expert. This is to secure spontaneous complete dilatation of the cervix—the slower the better. The next step is to give ether and do a perineotomy, which is a sort of paravaginal incision made on one side of the mid-line. This is to prevent injury to the pelvic fascia. "Under the minutest possible control of the fœtal heart tones—either the operator or an assistant listening every minute with the head stethoscope—the forceps are applied and delivery accomplished." Pituglandol is then injected into the deltoid. Five minutes later the operator inserts the left hand into the vagina or lower uterine segment, palm up, while with the outside hand the hard (pituitrin) uterus is pushed down on the already descended placenta. Ergot is now injected into the thigh, and "if there should be undue bleeding another ampoule of pituitrin is injected directly into the uterine muscle through the abdominal wall. Uterine tamponade is almost never needed". "The woman is now given $\frac{1}{4}$ gr. of morphine and $\frac{1}{200}$ gr. of scopolamine to reduce the amount of ether required for the repair work, to prolong the narcosis for many hours post partum, and to abolish the memory of the labour as much as possible. The cervix is pulled down and repaired, and the perineotomy wound is sutured under ether anæsthesia." De Lee says that Potter's use of version has justly evoked a storm of disapproval. He also says that were not the results he has secured by 'prophylactic forceps' so gratifying, he himself would call it meddlesome midwifery.

C. B. Reed,[4] of Chicago, advises the induction of premature labour as soon as the child is mature, the normal end of intra-uterine life having then been accomplished. "If we can establish the signs of this phenomenon and have the means of recognizing them in the uterus, it will be possible to say at a given time that the mission of gestation has been fulfilled." The author argues that the length and weight of the child can be estimated in utero, also the diameters of the fœtal head, with sufficient accuracy to establish its maturity. After this, every week, he says, intensifies the obstetric problems, and, by raising the chances of serious operative complications, adds materially to the peril of mother and child. He therefore induces labour, when the child is mature, by castor oil and quinine, by quinine and pituitrin, or by the Voorhees modification of the de Ribes bag.

Dry Labour.—F. A. Dorman and E. C. Lyon[5] contribute a critical study of 270 cases of dry labour. They point out that their deductions are necessarily confused by the fact that many of the cases had reasons other than early ruptured membranes for prolonged labour, fever, and infant mortality. In other words, obstetrical complications seem to be the cause of dry labour nearly as frequently as dry labour is the cause of complications. Their figures show that the length of time during which the membranes are ruptured before labour begins, is not an important factor either in prolonging labour or in producing morbidity or fœtal mortality. Protracted duration of pains in dry labour, on the other hand, greatly increased the maternal morbidity and tripled the fœtal mortality. The morbidity increased consistently in proportion to the number of vaginal examinations. The writers hold that every vaginal examination with ruptured membranes is dangerous, and that rectal examination should be used as a substitute as far as may be possible. The use of dilating bags, even when employed to induce labour, did not reduce morbidity, and seemed unfavourable to the fœtus. With an operative termination in 54 per cent of induced labours, and an average labour of over 12 hours, it is doubtful whether induction of labour by bags is justifiable. Dry labour appears to demand operative termination in one-third of the cases, and the risks are specially increased in breech cases. The writers mention that, in spite of the grave prognosis usually given when Cæsarean section is required after early rupture of the membranes, the cases in their series delivered by this method had very good results. They conclude that early rupture of the membranes increases puerperal morbidity by 8·5 per cent, and fœtal mortality by 3 per cent. The dangerous factors they place in three groups: (1) Prolonged labour; (2) Intra-uterine contamination (usually from vaginal examinations); and (3) Operative terminations.

REFERENCES.—[1]*Amer. Jour. Obst. and Gynecol.* 1921, March, 560; [2]*Ibid.* 1921, March, 574; [3]*Ibid.* 1920, Oct., 34; [4]*Ibid.* 24; [5]*Ibid.* 1921, March, 595.

LARYNGOSCOPY. (*See* ENDOSCOPY, PERORAL.)

LARYNGOSPASM.

Frederick Langmead, M.D., F.R.C.P.

A diminished calcium content has been demonstrated in these cases, and also after removal of the parathyroids; consequently much argument has centred around the possible relationship of parathyroid defect, diminished calcium content in the blood, and laryngospasm (tetany, spasmophilia). A. Martin Calderin,[1] experimenting with eight guinea-pigs, injected daily intravenously 1 or 2 c.c. of a 1–1000 solution of a decalcifying salt (potassium oxalate). The animals all developed convulsions in from 3 to 6 days, but on being injected similarly with parathyroid extract improved almost at once and were soon well. Thymus extract seemed to have a similar but weaker effect. Calderin advocates that the treatment should be as follows: Attack the dyspepsia, supply the lacking calcium, and ensure its proper assimilation by parathyroid (and possibly thymus) extract treatment.

REFERENCE.—[1]*Arch. Españ. de Pediatria,* 1920, Sept., 513 (abstr. in *Jour. Amer. Med. Assoc.* 1921, Jan. 15, 212).

LARYNX, AFFECTIONS OF. (*See also* RADIOTHERAPY.)

A. J. M. Wright, M.B., F.R.C.S.

Laryngeal Paralysis.—Logan Turner[1] has met with six cases in his own practice, of paralysis of the recurrent laryngeal nerve in association with malignant tumour of the breast. All the cases had had the breast removed and the axilla cleared some time before, the average period since operation being three and a half years. The tumour affected the right breast three times and the left three times, but the laryngeal palsy was present on the left side in 4 cases and on the right in only 1. Thus in 2 cases the paralysis was on the opposite side to the breast tumour. All the cases were seen in consultation on account of hoarseness. and in none of them had any operation been performed on the neck. In 5 of the cases the supraclavicular glands were found to be enlarged at the time of the laryngeal palsy. The paralysis is probably due to infection of the chain of glands along the recurrent laryngeal in the superior mediastinum. having spread in the homolateral cases from the axillary glands to the supraclavicular group and thence to the recurrent laryngeal group. In the contralateral cases infection spreads by superficial lymphatics from the inner segment of the breast across the middle line, and either direct over the clavicle to the supraclavicular group, or via the axillary glands to this group. Turner suggests that, if systematically searched for, a laryngeal palsy would be found not uncommonly in the later stages of malignant disease of the breast.

Laryngeal Stenosis.—Chevalier Jackson,[2] as a result of thirty years' experience in dealing with over 200 cases of chronic laryngeal stenosis sent to him for treatment, concludes that the stenosis is due, in approximately one-sixth of the cases, to the faulty tracheotomy performed for the primary acute laryngeal condition. In support of this view, he states that, of 100 cases of tracheotomy for acute dyspnœa performed in his clinic, not one developed chronic stenosis. The faults in method leading to these bad results may be epitomized as follows. The operation is usually postponed until too late, and has then to be done in a hurry. An anæsthetic is often administered, and by paralyzing the accessory muscles of respiration greatly increases the urgency and risk; a local anæsthetic is all that should ever be used. When the operation is done, it is done at too high a level and through too small an incision. The original incision should extend from 'Adam's apple' to the suprasternal notch, and the trachea be opened blindly, being located by touch in the bottom of the incision by the forefinger of the left hand. No important vessels are divided, and the thyroid isthmus can be ignored. The tracheal incision should never extend higher than the second ring. The wound should be left open, any suturing increasing the risk of sepsis and delaying healing. The cannula should be carefully fitted and of polished metal; rubber fosters sepsis. The outer tube should be removed and cleaned daily, and the inner cannula hourly or more often if obstructed. The fundamental cause of so many cases of chronic laryngeal stenosis lies in the faulty teaching in the surgical text-books. High tracheotomy should never be taught.

Foreign Bodies in the Larynx.—*See* Endoscopy, Peroral.

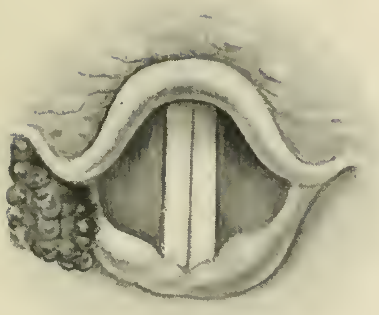
Carcinoma of the Larynx.—The importance of early diagnosis in intrinsic carcinoma of the larynx is extreme. Operations by laryngofissure on early cases of this condition show more favourable results than are found after operations on malignant disease in any other part of the body.

Until recently, diminished mobility of the cord affected, and the situation of the tumour in its posterior segment, were regarded as two of the most important factors in the establishment of the diagnosis of malignancy. That the former is neither a necessary nor desirable feature in diagnosis has already been shown by StClair Thomson (Medical Annual, 1921, p. 285). He now,[3] as a result of his experience in 50 cases in which the growth was removed by laryngofissure and the diagnosis confirmed histologically, controverts the latter view also. In only 24 of the 50 cases was the posterior third of the cord invaded. His conclusions as to the site of origin are: The growth always originates on the vocal cords or in the subglottic area. It is never found in the posterior commissure or originating from the ventricular bands or ventricle. It may originate in any part of the cord, but is more common in the central or anterior portion than in the posterior. The growth remains limited to the cord affected for a long time, but it may cross the anterior commissure, and in later stages invade the arytenoid and the area to the outer side of it. The inner surface of the cord may be affected primarily or by extension. The subglottic area may be invaded by a growth originating in a cord, but a growth may also originate in the subglottic area. A subglottic growth is much more common in the anterior than in the posterior part of the larynx.

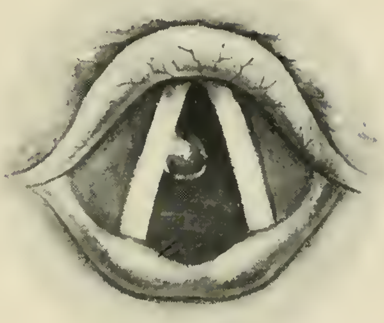
Amersbach[4] gives his experiences in the treatment of carcinomata of the pharynx and larynx with **X Rays.** He has found that repeated radiations before operation injure the healthy tissues and prejudice the result. No case

PLATE XXII.

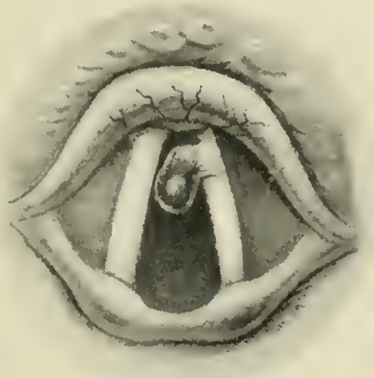
ANGEIOMA OF THE LARYNX



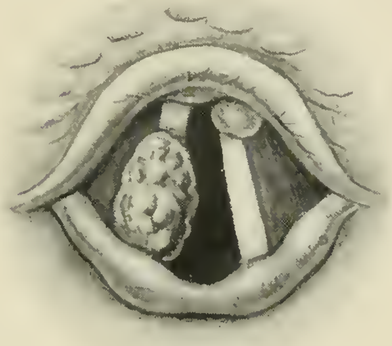
Angeioma of pyriform fossa
(*Morell Mackenzie*)



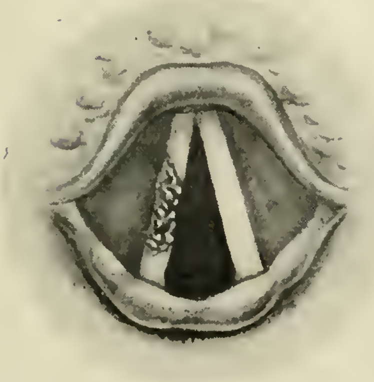
Angeioma of right vocal cord
(*Solis-Cohen*)



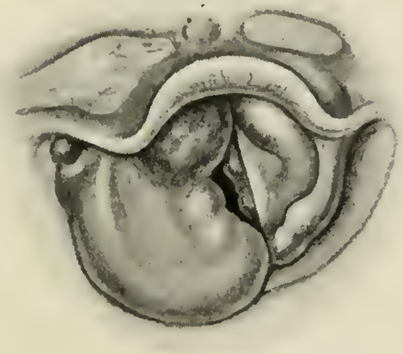
Angeioma of left vocal cord
(*Percy Kidd*)



Angeiomata of vocal cords
(*Norris Wolfenden*)



Angeioma of right vocal cord
(*Jurasz*)



Diffuse telangiectatic tumour
(*StClair Thomson*)

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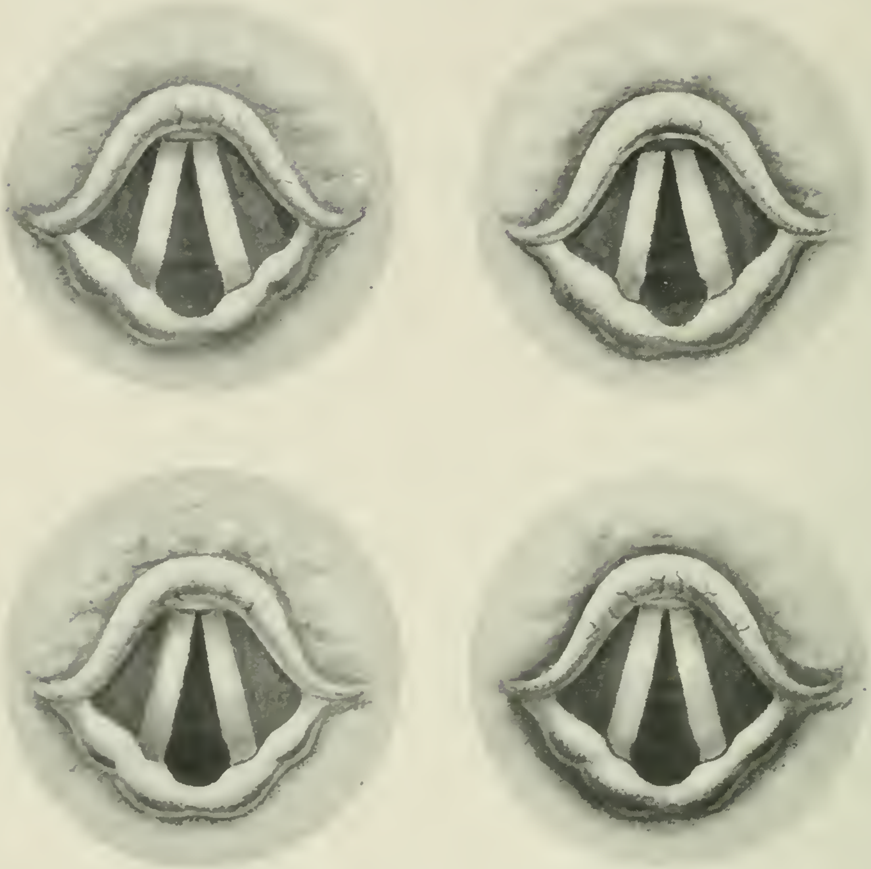
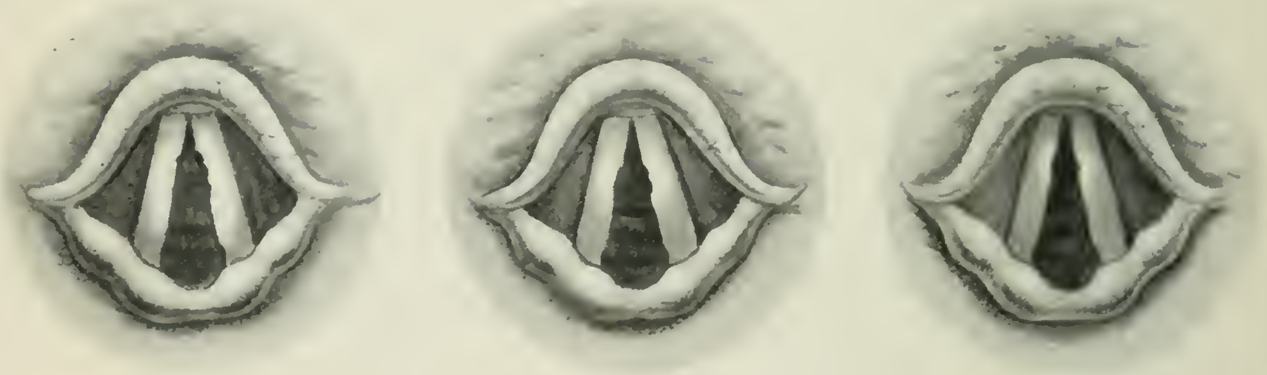
PLATE XXIII.

CHORDITIS FIBRINOSA



Stages of resolution in chorditis fibrinosa



Erosions of the vocal cords in chorditis fibrinosa

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was cured by *x* rays alone. Irradiation after operation seems to produce no bad results, and may be helpful.

Angioma of the Larynx (*Plate XXII*).—Irwin Moore,[5] in a very comprehensive article, has reviewed the records of 73 cases of this rare condition, which were all that he was able to find in the literature. They may be classified as simple, cavernous, diffuse, lymphatic, or mixed. These tumours are probably congenital in most cases, but only become evident during middle life owing to enlargement. They are usually single and sessile, and are most commonly situated on a vocal cord, but may involve any portion of the larynx. Symptoms, if any, are those common to all non-malignant growths of the larynx —namely, hoarseness, cough, and dyspnœa. Hæmoptysis sometimes occurs, and may be profuse. The diagnosis is made from the colour and consistency of the growth. After removal recurrence is rare. The great risk of the operation is hæmorrhage, and therefore thyrofissure with tracheotomy is to be preferred to removal through the natural passages. **Radium** has been found to produce a cure in several cases, and when available would seem the method of choice. Applications can be made either under suspension laryngoscopy or by passing an applicator upwards through a tracheotomy wound.

Chorditis Fibrinosa.—This name was first suggested by Seifert[6] in 1916 for a *fibrinous laryngitis* confined to the vocal cords. Brown Kelly[7] observed 40 such cases in soldiers during the war, and gives a description of the condition, the laryngoscopic appearances being illustrated in *Plate XXIII*, which has been kindly lent by the author. The condition is apparently confined to soldiers under service conditions. It is an uncommon variety of acute laryngitis, characterized by the deposition of fibrin and the occasional formation of erosions on the vocal cords. The symptoms are hoarseness and aphonia, and some cough, but no pain. The etiology is probably variable. Seifert attributed all his cases to influenza, and Ryland[8] to mustard gas. That neither of these are necessary factors is shown by Brown Kelly's cases. Of these 40, only 23 had been gassed, 3 had had influenza, and the remainder were attributed to such causes as cold, coughing, and shouting commands. The laryngoscopic appearances are typical. In the early stages, owing to a fibrinous exudate, the cords appear milky white. As resolution occurs the exudate clears up from the ends of the cords, showing the reddened and inflamed cord below, the last region to clear being the region of the junction of the anterior and middle thirds of the cords. Superficial erosions are sometimes present on the free margins of the cords. The only treatment is voice rest until the acute stage is passed, followed by any necessary measures directed to the resulting paresis.

REFERENCES.—[1]*Jour. Laryngol. and Otol.* 1921, Aug., 373; [2]*Surg. Gynecol. and Obst.* 1921, May, 392; [3]*Brit. Med. Jour.* 1921, i, 921; [4]*Deut. med. Woch.* 1920, xlvi, 1269; [5]*Jour. Laryngol. and Otol.* 1921, Jan., 11; [6]*Arch. f. Laryngol.* xxx, 83; [7]*Jour. Laryngol. and Otol.* 1921, Jan., 5; [8]*Ibid.* 1919, May, 153.

LEFT-HANDEDNESS. (*See* SINISTRALITY.)

LEGG-CALVÉ'S DISEASE. (*See* ORTHOPÆDIC SURGERY.)

LEISHMANIASIS. (*See* KALA-AZAR; TROPICAL ULCER.)

LEPROSY.

Sir Leonard Rogers, M.D., F.R.C.P., F.R.S.

E. Mangenie[1] reports an instructive example of the spread of leprosy in the small island of Rodrigues, near Mauritius, where in the course of about 40 years 23 cases have originated from one man, who developed leprosy four years after arrival there, nearly all the cases having occurred in his family or that of his employer. P. Harper[2, 3] discusses the symptoms of leprosy as seen in Fiji, and describes a macular stage without neuritis or nodules, the nerve stage with macules but no nodules, and the nodular stage in which neuritis can also always be found. He used Mercado's intramuscular injection of **Chaulmoogra Oil** for two years, during which 23 patients were discharged on parole, only one of whom relapsed ; but latterly he has injected intravenously with success a mixture of **Carbolic Acid** 1 part, **Ether** 25 parts, and **Chaulmoogra Oil** 75 parts, beginning with 10 min. and increasing to 20 min., daily for six days of the week and continued for at least five months. Undoubted improvement has occurred in a number of cases during the four months' trial of this method. T. A. Henry[4] describes the important work on chaulmoogra oil carried out at the Wellcome Chemical Research Laboratories since the original investigations during 1904–5 of Power, who first prepared the ethyl esters of the chaulmoogra acid series which led up to the recent work of Rogers and Dean. J. T. Donald[5] reports the recent results obtained in Honolulu with the ethyl ester chaulmoogrates prepared by Dean, and is now able to record 78 cases of apparent cure. Febrile reactions and eruptions, usually irregularly circular, dull-red, raised lesions, occur in 9 per cent of cases, but are not considered to be nodules, as most of them are free from bacilli. Beaded and granular changes occur in the bacilli, and they break up under the treatment (as originally described by Rogers), which is an important sign of favourable progress of the patient. L. Rogers[6] discusses further the results of his treatment of leprosy and its bearing on the tuberculosis problem. F. G. Cawston[7,8] records improvement of leprosy cases under **Antimony**, both orally in the form of vinum antimoniale 15 to 20 min. t.d.s., Oppenheimer's colloidal antimony (oscol stibium) in doses of 2·5 to 4 c.c. intramuscularly, and a 2 per cent solution of tartar emetic intravenously. C. Davies[9] has found both **Sodium Morrhuate** and **Sodium Linate** (made in a similar manner from linseed oil) of value in both leprosy and tuberculosis, including a case of tuberculous epididymitis and early pulmonary infection quite well three to four years after treatment, and also some leprosy and more advanced phthisis cases which had improved very greatly. The preparations appear to vary in irritant and curative properties ; some sodium linate made for him was non-irritating, although Rogers had reported some he made to be painful on injection ; more work is required therefore at the chemical methods of preparation.

[E. Muir reports to me that he has obtained an almost painless preparation of ethyl ester hydnocarpate by removing all free fatty acids from it, which perhaps explains the above experiences.—L. R.]

J. A. Shaw-Mackenzie[10] discusses Rogers' work on leprosy treatment, with reference to his own work on the fat-splitting ferment, enzyme lipase, any increase in which he has long regarded as an important defence against cancer and bacterial invasions : and he explains the results obtained in leprosy and tuberculosis as due to the production of the lipolytic ferment in the tissues, which acts on the fats and lipoids of the tubercle and leprosy bacilli. E. Muir[11] has published a very useful *Handbook on Leprosy* dealing more particularly with the diagnosis and new methods of treatment of the disease, which will greatly facilitate their use.

References.—[1] *Jour. Trop. Med. and Hygiene*, 1920, 238 ; [2] *Ibid.* 285 : [3] *Ibid.* 1921, 137 ; [4] *Ibid.* 1920, 249 ; [5] *Jour. Amer. Med. Assoc.* 1920, ii, 1483 ; [6] *Lancet*, 1921, i, 1178, and *Practitioner*, 1921, Aug., 77 ; [7] *Brit. Med. Jour.* 1920, ii, 855 ; [8] *Ibid.* 1921, i, 419 ; [9] *Ind. Med. Gaz.* 1921, 283 ; [10] *Jour. Trop. Med. and Hygiene*, 1921, 161 : [11] *Handbook on Leprosy, its Diagnosis, Treatment, and Prevention*, published by R. J. Grundy, Cuttako, India.

LEUCOCYTOSIS, MONONUCLEAR. (*See* Leukæmia.)

LEUKÆMIA.

Herbert French, M.D., F.R.C.P.

Acute Myeloblastic Leukæmia.—Packard and Flood[1] review the pathogenesis of this condition. Lowitz originally contended that leukæmia was a disease of the blood, but in 1870 Newman called attention to the lesions in the bone-marrow, which led to Lowitz's theory being discarded. Banti's theory that it is a neoplastic or sarcomatous condition is opposed by the peculiar remissions which occur so regularly, and further by the bona fide cases of cure which are recorded in myelogenous leukæmia. On the other hand, no specific organism has been demonstrated. Danish workers have claimed to have produced either myeloid or lymphatic leukæmia in chickens by means of filterable virus, but other competent workers have failed to achieve like results. Cabot mentions the case of a nurse who contracted the disease when nursing a leukæmia patient, and there are stories of epidemics of the disease at Enz in 1905 and in Toulouse in 1912, but none of these appear beyond the long reach of the arm of coincidence. Yet the clinical symptoms such as the pyrexia, the swollen spleen, the hæmorrhagic condition of the mouth, the state of the tonsils, and the intestinal symptoms, all favour an infective origin, but we must remember that there are so many secondary invaders that it becomes difficult to recognize what symptoms are primarily leukæmic and what are due to the secondary invaders. The evidence in favour of an infection is at the present time preponderating but not conclusive. The cases of mononuclear leucocytosis reviewed in this article and the response of the blood in the various infections there mentioned, as well as in glandular fever, all seem to point in the same direction, and the question may be one of infection in varying degree of severity or with organisms of different degrees of toxicity.

It is interesting in this context to read Howell's[2] report on her investigations into the known failure of antibody formation in leukæmia. One patient with lymphatic leukæmia and one with myelogenous leukæmia were each inoculated with 0·5 c.c. triple vaccine containing 1000 million *B. typhosus*, and 750 million each of *paratyphosus A* and *B*. At no time did the serum, even when undiluted, show the presence of any agglutinin or opsonin, while in a healthy person infected at the same time agglutinin and opsonin were present in high serum dilutions after the twelfth day. This would seem to explain the fatality of intercurrent infections and the fatal sepsis due to the common pyogenic infections which are observed not infrequently in leukæmic patients.

Mononuclear Leucocytosis.—A paper on this subject by Sprunt and Evans[3] is of interest. They describe 6 cases which all exhibited a mononuclear leucocytosis in reaction to an acute infection. Each ran a febrile course with moderately severe prostration. In 4 there was evidence of tonsillitis or other infection of the upper respiratory tract, with a moderate glandular enlargement ; 4 also showed some enlargement of the spleen. The total leucocyte count was normal at first, but later became moderately increased. The differential count showed a slight increase in the cells of the large mononuclear transitional group, and the presence of many pathological lymphoid forms. They summarize the information to be obtained from these six cases as follows : (1) In addition to the mononuclear leucocytosis seen commonly in children, in adults a mononuclear leucocytosis occasionally occurs as a reaction to acute infection ; (2) This is not a simple lymphocytosis as in children, but is made up largely of pathological forms, probably all lymphoid in origin ; (3) When first seen during the febrile period, especially in the early stages, these cases cannot be differentiated certainly from leukæmia, but the subsequent benign course, with early disappearance of the fever and more gradual return to normal of the blood-count, make the diagnosis clear.

Four similar cases are very fully described by Bloedorn and Houghton[4] in a paper on the "Occurrence of Abnormal Leucocytes in the Blood in Acute Infections", with the sub-title of "Acute Benign Lymphoblastosis". The appearance in the blood of cells indistinguishable from those found in acute leukæmia, together with enlargement of lymph glands and sometimes of the spleen, accompanied by moderate fever and absence of definite signs of any other morbid entity, is a clinical condition which might easily give rise to a grave prognosis. These cases differ from the lymphocytosis commonly seen in the blood of children, such as that due to congenital syphilis, rickets, scurvy, whooping-cough, and cholera infantum, or from that which in adult life may be caused by cervical adenitis, enlarged tonsils, chlorosis, hæmophilia, and the secondary anæmia associated with syphilis, tuberculosis, and malaria. The cases discussed in this paper have a different aspect and clinical picture from any of the above.

Both of the above pairs of observers suggest that these cases may represent a distinct clinical entity, for which Bloedorn and Houghton have tentatively put forward the name 'acute benign lymphoblastosis'. There is usually a history of about one week's malaise, with headache, slight cough, and lassitude. Enlargement of the lymph glands is found in the anterior posterior, and submaxillary triangles of the neck, in the axillæ, and in the groins. There is a considerable degree of pyrexia in the early stages, when the temperature may be over 103°; and during the first week it varies between 99° in the morning and 102° in the evening. In the second weeek the temperature gradually approaches normal, and the patient is up and about again by the end of this period. The enlargement of the glands, though much less, may still be perceptible at the end of six weeks, and the lymphocytosis may persist for several weeks after the temperature is normal. The term lymphoblast is considered preferable to mononuclear leucocyte, as the cells are non-granular and are apparently of lymphadenoid origin. They never show peroxidase granules, and the nucleus is more sharply outlined than are those of myeloblasts.

The cases all occurred in young adults, and would appear to be due to some infectious agent gaining entrance through the upper respiratory passages, with stimulation of the lymphadenoid tissues to the production of these abnormal cells. In three of the cases Vincent's angina was present, and though lymphoblastosis is not the common finding in a Vincent's infection, the association of the two conditions points to an infection being at the root of the trouble.

In view of some points of resemblance to glandular fever (q.v.), it may be as well to tabulate the differentiating features of this latter disease: (1) It is infectious and occurs in small epidemics; (2) It is a disease of children principally, although adults are not immune; (3) The cervical glandular enlargement is commonly unilateral at the onset; (4) Epistaxis, vomiting, abdominal pain are frequent; (5) The liver is usually enlarged, either with or without the spleen.

Under lymphoid-pseudoleukæmia Stitt[5] describes a similar blood condition, but in his cases there was a tendency to hæmorrhage in the later stages.

Diagnosis.—The difficulty of differentiating between lymphocytes and myelocytes in some cases in which the granularity of the cells is not brought out by the usual Wright and Leishman stain, has led Lambright,[6] of Ohio, to use the oxydase method of staining films. For this the following solutions are required:—

Solution A.—Formalin, 40 per cent	.. ..	1 part
Alcohol, 95 per cent	.. ..	9 parts
Solution B.—Alpha-naphthol (Merck's reagent)	..	1 grm.
Hydrogen peroxide	.. ..	0·2 c.c.
Alcohol, 40 per cent	.. ..	100·0 c.c.

Solution C.—Pyronin	.. .. ..	1 grm.
Aniline	.. .. ..	4 c.c.
Alcohol, 40 per cent	.. ..	96 c.c.

Solution D.—Methylene blue, 0·5 per cent (Grutler's B X.)

The method is as follows: Fix by covering the film with *Solution A* for two minutes.

Wash off with water and flood with *Solution B.* Wash off and allow film to remain in running water for fifteen minutes. Dry and stain for two minutes with *Solution C.* Wash off with water and cover with *Solution D* for thirty to sixty seconds. Wash off and blot dry.

By this method all myeloid cells, polynuclears, myelocytes, transitionals, and myeloblasts will show blue granules, while lymphocytes and lymphoblasts will not, nor will red blood-cells. *Solution B* deteriorates very rapidly, and must be made up fresh.

TREATMENT.—Upson[7] reports a case which he has treated by **X Rays** for four years. In 1916 three series of treatment were given, when the leucocyte count was reduced from 142,500 to 9000. Ten months later the patient returned with a leucocyte count of 225,000, which a month's treatment reduced to 65,000. In 1918 another series of treatments was given with good results, and again in 1919. In February, 1920, another series was given, especial attention being paid to the ends of the long bones, after which the spleen was given the usual cross-fire treatment. At the beginning of this course the leucocyte count was 206,200, while at its completion the figure was 67,000. The spleen had decreased in size but was not normal, while the patient had gained in weight and had improved generally.

Renon and Degrais[8] record the results of **Radium** exposures to the spleen of 8 cases over a period of ten years. The immediate results, as other observers have found, are remarkable, and the patients appear cured. This unfortunately is only temporary, and in from two to eighteen months the signs of leukæmia return, while the curative effect of radium seems to have diminished or be lost, possibly due to the development of progressive resisting power to the radium rays by the myelocytes. The conclusion the authors come to is that the irradiation should be as intense as possible with longer intervals between, in order to postpone and attenuate recurrences. When fibrous transformation of the spleen is presumed to exist, the bone-marrow should also be irradiated. By these means survival for five or six years, with every aspect of health, may be hoped for.

REFERENCES.—[1]*Amer. Jour. Med. Sci.* 1920, Dec., 883; [2]*Arch. of Internal Med.* 1920, Dec., 707; [3]*Johns. Hop. Hosp. Bull.*, 1920, xxxi, No. 357; [4]*Arch. of Internal Med.* 1921, March, 315; [5]*Practical Bacteriology, Blood Work, and Animal Parasitology*, 6th ed., 1920; [6]*Amer. Jour. Med. Sci.* 1921, Feb., 209; [7]*Amer. Jour. Roentgenol.* 1920, Dec.; [8]*Bull. de l'Acad. de Méd.* 1921, Feb. 15.

LEUKÆMIA, LYMPHATIC, WITH PRIMARY MANIFESTATIONS IN THE SKIN.

E. Graham Little, M.D., F.R.C.P.

Butler[1] reports a remarkable case of this rare condition in a woman, age 35, in whom the disease began with tumours of the skin, at first single, but soon becoming multiple, reddish-brown in colour, shown by histological examination to be made up of collections of large lymphocytes. There was no alteration in the blood until much later, when the skin tumours had become numerous. At no time were there glandular or visceral alterations. The disease seemed to be ushered in with an infection of the throat, which was assumed to be rheumatic. The leucocytic count, at first 5000, was found six weeks later to have risen to 40,000 to 52,000, and hæmoglobin sank from 65 per cent to 25 per cent. The patient died within six months of being taken ill, and at her death had more than 500 tumours on the body. No post-mortem examination could be made.

Reference.—[1]*Arch. of Dermatol. and Syph.* 1920, Nov., 594.

LICHEN PLANUS.

E. Graham Little, M.D., F.R.C.P.

Jacob[1] offers a study of the disease based on 179 cases, 5 of them negroes, a point of interest, as the negro has been supposed to be refractory to this disease; 110 females and 69 males were recorded, and as regards occupation there was a notable preponderance of indoor workers. The youngest patient was a girl of two years, whose mother had been under treatment for the same disease some weeks previously. The oldest patient was seventy-seven. The arms, hands and wrists, neck, trunk, and thighs were the most frequent sites. Bullæ were found in 6 cases. The author favours the microbic explanation of causation, without producing any new evidence for it. The treatment adopted included the giving of **Arsenic**, the most efficient form of which was found to be Asiatic pill, **Mercury**, in the form of chloride or proto-iodide, and, in hypertrophic cases, **X Rays.**

Reference.—[1]*Arch. of Dermatol. and Syph.* 1920, Nov., 606.

LIP, TUBERCULOSIS OF. (*See* Skin, Tuberculosis of.)

LIVER FUNCTION TESTS.

O. C. Gruner, M.D.

In a recent review[1] of the biochemical work on renal and hepatic function since Losee and van Slyke,[2] and in Löffler's work on eclampsia,[3] the conclusion is reached that there is no satisfactory method of estimating the functional capacity of the liver. The fact that there is an abnormal urinary nitrogen distribution in the urine in cases of this kind is undisputed. The difficulty is the interpretation. A low nitrogen percentage cannot be regarded as evidence

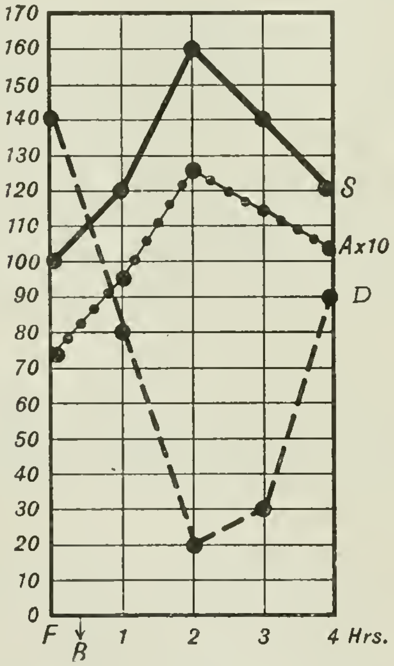

Fig. 50.—Chronic pancreatitis from invading gastric ulcer.

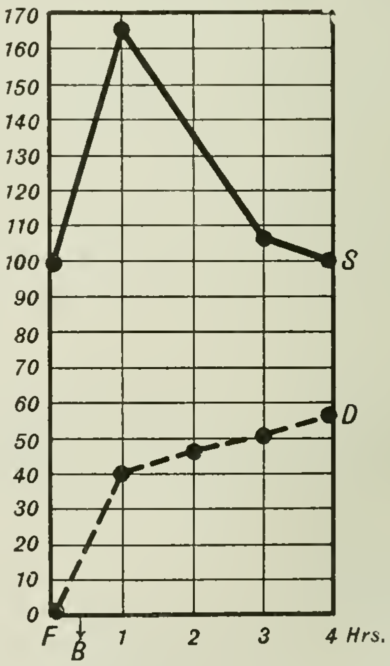

Fig. 51.—Hepatic insufficiency.[7]

A. Amylolytic ferment × 10 sugar. *D*, Difference value. *F*, Fasting half an hour. *B*, Breakfast. *S*, Blood.

of hepatic failure unless the total nitrogen metabolism is measured at the same time. Löffler shows how the surviving portion of a diseased liver (poisoned by phosphorus, for instance) can maintain the urea-forming function of the whole, however difficult it may be to believe that a given specimen, studied microscopically in the ordinary way, could have executed this work. Similarly, the assessment of the desaminating function, and the glycuronate test, are inadequate means of study. The last-named test consists in giving ½ grm. of camphor. Normally this is followed by marked excretion of glycuronic acid ; in hepatic disease there is little or no such excretion.

Cammidge, Forsyth, and Howard[4] contribute an extension of their previous work on the 'difference value' (*see* Medical Annual, 1921, p. 353). They find that disturbances in the functions of the liver also change the relation normally existing between the difference value and the sugar content of the blood.[5] When the estimations are made at hourly intervals after a meal, a difference-value curve of an entirely distinct character from that occurring in association with pancreatic insufficiency is found. The 'hepatic curve' is shown in the *Fig.* 51, and the contrast with the curve of pancreatic insufficiency (*Fig.* 50) is easily observed. In the normal fasting state, the difference value is nearly zero, but in pancreatic insufficiency in the fasting period it is very high (*Fig.* 50). In hepatic derangement, the difference value is as in health (*Fig.* 51). After breakfast the latter curve gradually ascends, and continues for several hours independent of the fall in the blood-sugar which usually occurs at, or about, the third hour after the meal. The final level is ten or twelve times the normal height. These observers find that the 'hepatic curve' bears no constant relation to the sugar content of the blood. They believe that the increase of difference value is due to the passage of a dextrin-like substance from the alimentary tract into the blood instead of being retained in the liver. Dextrin-like bodies derived from the glycogen store of the liver may help to raise the difference value. They believe that the liver is the main source of the amylolytic ferment of the blood, but Davis[6] came to the conclusion that this ferment is derived solely from the pancreas.

The close inter-relations between the liver, spleen, pancreas, and gall-bladder need to be constantly borne in mind. This theme is fully worked out by Sir Berkeley Moynihan in an expansion of the Bradshaw Lecture of 1920.[7]

References.—[1] *Med. Science*, 1921, Sept., 537–546 ; [2] *Amer. Jour. Med. Sci.* 1917, cliii, 94 ; [3] *Biochem. Zeits.* 1920, cxii, 164 ; [4] *Lancet*, 1921, i. 1017 ; [5] *Ibid.* 274 ; [6] *Amer. Jour. Physiol.* 1921, lvi, 22 ; [7] *The Spleen and some of its Diseases*, John Wright & Sons, Bristol, 1921.

LOOSE BODIES IN JOINTS. (*See* Orthopædic Surgery.)

LUNG, GANGRENE OF.

Arthur Latham, M.D., F.R.C.P.

Treatment.

Treatment of Gangrene of Lung with Neo-arsphenamin.—W. Reichmann[1] reports a case of gangrene of lung in which the administration of various remedies and the application of inhalations had proved inefficacious. He then gave the patient 0·6 grm. of **Neo-arsphenamin** intravenously. Although the next day the expectoration and the cough were increased, beginning with the second day the cough and expectoration abated. By the eighth day expectoration had ceased and the cough was very slight. No reactions followed the injection.

W. Stepp[2] reviews the literature on gangrene of lung, and finds that before operative treatment was introduced in 1901 the mortality under medical treatment was very high, possibly from 75 to 80 per cent. Under **Operative Treatment** the mortality has been reduced to 32·3 per cent, or, deducting the far-advanced, hopeless cases, to 26·8 per cent. He has recently found neo-arsphenamin a very useful remedy in this disease. Acute cases, in which the gangrene was not preceded by pulmonary disease of long standing, seem to be best adapted to such treatment. The dosage varies from 0·3 to 0·6 grm. If the pus is not coughed up, or if empyema is a complication, these conditions may possibly be regarded as contra-indications to neo-arsphenamin treatment. More detailed knowledge of the indications and of the treatment in general will have to be gained by more extended experience. Gangrene followed pneumonia in one of the three cases reported; spirilla were found in the sputum in one case. In one man of 40 the sputum dropped from 225 c.c. to 0 in three days, the sixth day after the injection by the vein of 0·6 grm. of neo-arsphenamin.

References.—[1]*Therap. Halbmonats.* 1920, Aug. 15, 442; [2]*Ibid.*, March 15, 161.

LUPUS ERYTHEMATOSUS. (*See also* Epithelioma of the Skin.)

E. Graham Little, M.D., F.R.C.P.

Lupus Erythematosus and Focal Infection.—Hartzell[1] reports a convincing case of the cure of a long-standing and very intractable lupus erythematosus after the extraction of a carious tooth which had been capped but had not given any symptoms of trouble. Unfortunately, no identification of the septic infection of the tooth was made.

Reference.—[1]*Arch. of Dermatol. and Syph.* 1920, Oct., 441.

LYMPHADENOMA. (*See* Hodgkin's Disease.)

LYMPHATIC GLANDS IN THE NECK. *Sir W. I. de C. Wheeler, F.R.C.S.I.*

Evidence is growing that timely removal of tonsils and adenoids in cases of cervical adenitis obviates the necessity of extensive dissecting operations. The tonsil is chiefly a lymphatic gland, and its drainage area includes the nasal passages and the nasopharynx, the infection of these regions being the probable cause of its enlargement, and it is now generally agreed that enlarged tonsils are seldom found in children in the absence of adenoids. They are a portal through which tubercle bacilli enter the cervical lymphatic glands. If, after removal of the tonsils, the children are treated in sanatoria, the glands will subside sufficiently to make removal unnecessary. It is of course well known that milk carries the tubercle to the tonsil; the latter often appears to be unaffected, but harbours the tubercle bacilli, which pass to the lymphatic glands of the neck, or further on to the bones and joints. Fresh air, good food, accompanied by a **Pure Milk Supply,** and **Removal of the Tonsils,** is the ideal treatment. **X-ray Therapy** has been followed by good results in tuberculosis of the glands in the neck. **Tuberculin Injection,** carried over a long period, have also apparently given good results.

The *Lancet,*[1] referring to an address by Sir Alfred Pearce Gould, concludes an article on enlarged cervical glands as follows: "By no means all enlarged cervical glands are tuberculous, many being cases of so-called simple inflammation, but the proportion is difficult to estimate; the majority of cases of great enlargement and of chronic suppuration are tuberculous, and it is probable that simple septic glands are liable in time to become infected by tubercle bacilli passing through the tonsils, which may or may not themselves show evidence of tuberculous deposit."

A. P. Mitchell[2] found histological evidence of tuberculosis of the tonsils in 37·5 per cent of 64 consecutive cases of tuberculous disease of the upper cervical glands, and in 6·5 per cent of 90 children who showed no evidence of tuberculosis. It is important to note that this tuberculosis of the tonsils is truly latent; the tonsils are pale, not ulcerated, and often quite small, as was pointed out by A. D. Fordyce and E. W. G. Carmichael.[3] Therefore, as it is probable that in tuberculosis of the cervical glands the portal of entry is through the tonsil, and as it is impossible by clinical examination to exclude tuberculosis of this organ, the wise course is to remove the tonsils in all such cases, even though they do not appear to the eye to be unhealthy. After this operation the child should be placed under the best possible hygienic conditions for several months, when in most cases the glands will have so far subsided as to render their removal unnecessary, and in other cases a much smaller dissection will be required than appeared at first to be indicated. Whether we can go back still another stage, and by means of proper nasal hygiene avoid the tonsillar infection, is a question that deserves attention. **Nasal Drill** is coming to be regarded as a fundamental element in anti-tuberculosis work among children. At least 80 per cent of children sent to sanatoria are found to be imperfect nasal breathers, and the correction of bad respiratory habit is at least as important as an effort to fatten the child.

Treatment of Wounds of the Thoracic Duct in the Removal of Tuberculous Cervical Glands.—Edington[1] describes two interesting cases. The important point about the first case was the copious watery discharge thirty-six hours after operation. The discharge became milky on the fourth day, there was maceration, some hæmorrhage from the internal jugular veins, pyrexia, and on the twelfth day profuse hæmorrhage. The patient died on the thirteenth day. There was a similar accident in the second case, a lady, 28 years of age. Her recovery was uneventful. Edington makes the following remarks after describing the two cases:—

1. *Delayed Onset of Chylorrhœa.*—In neither of these cases was the wounding of the duct recognized or suspected at the time of operation, and characteristic discharge was only noted thirty-six and twenty-four hours respectively after operation. The amount of discharge was very great, rapidly drenching the dressings, the clothing, and even the bedding.

Various reasons for delay in the appearance of the chylorrhœa have been advanced. Pre-operative 'preparation' of the patient, and post-operative restriction of diet may exert some influence in that direction. It has also been suggested by Vautrin that "the injury may cause a reflex spasm or contraction of the walls of the lymphatics, which for a time obliterates their lumen."

But, in attempting to account for the delay, there is another possible factor which I have not seen mentioned, viz., the *action of the anæsthetic.* It was found in *Case* 1 that when, under an anæsthetic, the wound was opened up for inspection on the fourth day, and wiped clean, the discharge of chyle ceased for the time being, and no evidence of its source was discoverable. If we may judge from this, it is probable that the anæsthetic may have some effect in retarding or temporarily stopping the flow of chyle.

Recorded cases in which the occurrence of the injury to the duct was recognized during the operation, by a sudden flooding of the wound with clear or even milky fluid, show, however, that these factors are by no means constant.

2. *Effect of the Discharge on the Tissues.*—In both cases there occurred maceration, and even in the first case, in which the pyrexia pointed to sepsis, there was no appearance of sloughing, but the parts in the cavity of the wound were preternaturally clean. The occurrence of this maceration raises the possibility that chyle may exert a digestive effect on the tissues, with a resulting friability which was markedly exemplified in the wall of the jugular vein in *Case* 1.

3. *General Effect of the Injury.*—The absence of emaciation in *Case* 2, and

the satisfactory recovery, showed that even during the chylorrhœa the patient was getting a considerable proportion of chyle into the blood. How this came about was not demonstrable; but it was most probably due to the existence of the multiple communications, in neck or thorax, between the duct and the venous system, which have been described by various anatomists.

4. *Treatment.*—While theoretically the best treatment would be to open up the wound and ligate the leaking duct, my experience in *Case* 1 decided me not to try it in the second case. Packing the operation cavity with gauze, while not actually plugging the leak, probably aided the formation of granulations, after which outside pressure proved very effective.

[The reviewer has had one similar experience, but the patient made an uneventful recovery. The wound was kept open by loose plugging with iodoform gauze.—W. I. de C. W.]

REFERENCES.—[1]*Lancet*, 1921, i, 1193; [2]*Ibid.* 1913, ii, 1620; [3]*Ibid.* 1914, i, 23; [4]*Glasgow Med. Jour.* 1921, June, 398.

MALARIA. (*See also* BLACKWATER FEVER.)

Sir Leonard Rogers, M.D., F.R.C.P., F.R.S.

ETIOLOGY AND EPIDEMIOLOGY.—S. T. Darling[1] has proved experimentally that *A. ludlowi* can convey malignant tertian malaria to man. · B. Blacklock and H. F. Carter[2] found oocysts in 1 of 12 *A. plumbeus* fed once on a case of malignant tertian malaria, but failed to infect this mosquito from a benign tertian case. B. Blacklock[3] found *A. plumbeus* breeding in water-containing holes in trees in England up to 32 feet from the ground, which may be very difficult to detect. M. O. T. Iyengar[4] reports on a malarial survey of Calcutta and its environs. Stephens and Christophers had reported in 1900 that the endemic index of malaria in Calcutta was 0, but Iyengar has found that *A. stephensi* is breeding extensively in the numerous cisterns in Indian houses in the heart of Calcutta, which are necessitated by the intermittent water-supply of the city, which in its turn is due to the immense waste of water from running taps in Indian houses. As *A. stephensi* was shown by Bentley to have been the carrier during an epidemic of malaria in Bombay some years ago, a like visitation may at any time attack Calcutta. E. P. Minett[5] describes and illustrates the successful filling up of a mosquito-breeding street drain in Georgetown, British Guiana, with town refuse. P. Hehir[6] returns to the subject of mosquito nets, which were used in India at least as far back as Annesley's time in 1826, but Hehir thinks wiring of houses in malarial places is a more efficient and economical method of protection.

J. E. M. Boyd[7] discusses the value of small fish in destroying mosquito larvæ, and found small numbers of mosquito larvæ in the stomachs in 80 per cent of those he examined, but found fish and larvæ living together in dykes, etc., so their value in reducing the mosquitoes is limited. T. Southwell,[8] as a result of eight years' work as Director of Fisheries in Bengal, records his experience on the value of small fish in reducing mosquitoes. Fish breed largely in the monsoon months, when large numbers of small fish abound in the tanks and small pools, but the latter gradually dry up in the hot season, only fish which bury themselves in the mud surviving over that season in small collections of water. The Barbados millions were introduced into Ceylon as an antimalarial measure twenty years ago, but have practically died out. Several similar fish are indigenous in Bengal; these are better mosquito destroyers, but their value is greatly limited by the simultaneous presence in tanks, etc., of predatory fish which prey on the smaller species, while it is not practicable to get rid of the former. As the smaller mosquito-eating fish have doubtless been present for thousands of years in India, without reducing the mosquitoes sufficiently to lessen malaria. their effect appears to be negligible, and artificial measures to increase them are not promising. C. A. Gill[9] records an inquiry into malaria in Kashmir, where the disease is rare, and found five varieties of anopheles, including several malaria-carrying species, and concludes that the disease is limited by a critical altitude of between 5000 and 6000 feet, which is the average elevation of the Kashmir Valley. The same investigator[10] discusses the relationship of malaria and rainfall at the very malarious station of Amritsar in the Punjab, in continuation of Christophers' epidemiological work in the same province. Records from 1870 to 1913 were examined, and the well-known association of heavy rain with excessive autumnal malaria in this area shows a high correlation between the July-August rainfall and subsequent epidemic malaria, while the September rain is of minor importance, and June rain had no apparent effect. The economic factor of high prices increases the effect of heavy rain in producing malaria, and these factors allow of epidemics being forecasted about three weeks before their commencement, which is of practical importance. In such a place as Bombay this would not apply, so each place requires separate study.

A. Macdonald[11] deals with the relation of temperature to malaria in England, and shows that the last unusual prevalence of the disease in 1857–59 coincided with the exceptionally high mean temperatures of 58–60° from June to August, while the disease suddenly declined with the cold summer of 1860. As *A. maculipennis* is prevalent for nine months in the year, during which malarial parasites only develop at about a temperature of 60°, the latter appears to be the essential factor in England. B. Blacklock[12] deals with the pathology of an indigenous fatal case of malignant tertian malaria in England described by E. E. Glynn and J. C. Matthews.[13] L. Nicholls[14] describes the lost cities of Ceylon, and attributes their decay and depopulation to malaria. C. C. Bass[15] discusses the greater fatality of malignant tertian malaria over the other forms, and points out that in cultures the older and larger stages of the former are more resistant to pressure and thicker than red corpuscles, and so pass less readily through the capillaries, and get fixed there and multiply rapidly, producing blocking of the capillaries and coma due to brain infection, while they have very little amœboid movement. W. N. Leak[16] has found that the addition of 0·5 to 2 per cent of castor oil to kerosene increases many times the spreading power of the oil over water, while the reduction in the kerosene required makes it economical, but it has not yet been tried in the field.

Diagnosis.—J. Pratt-Johnson[17] reports on the differential diagnosis of malarial parasites in thick blood-films, which is simple in the case of the larger-sized, more fully developed parasites, but difficult in the small ring forms. However, benign tertian rings are larger, more irregular in shape and size, with a single relatively small chromosome, as compared with malignant tertian rings. The same worker[18] describes routine examination for parasites on a large scale in East African campaign troops on return to South Africa, who were all examined twice by the thick-film method at intervals of five to seven days, and only discharged after two negative reports and when passed clinically fit by a medical board, 250,000 blood tests being made. Unfixed thick films were placed in 2 c.c. of 1 per cent eosin in distilled water diluted with 220 c.c. distilled water, and 4 c.c. of 1 per cent azur II or of methylene blue added, until the films became a deep-bluish colour, usually in twenty to thirty minutes, dehæmoglobinization also taking place. Among 8818 men, 26·4 per cent showed malarial infection, and all these carriers were treated before discharge. Re-examinations of the blood enabled men shirking their quinine to be detected, as the asexual stages of the parasites disappeared within two to five days under adequate treatment. J. S. K. Boyd[19] also prefers the thick-film method after considerable experience, and places the slides in formalin 20 parts, glacial acetic acid 2 parts, and distilled water 78 parts, for ten minutes, and stains with borax methylene blue or Loeffler's methylene blue for two minutes or longer, by which means the parasites and leucocytes appear blue against a greenish background. Pigmented forms are well seen, but subtertian rings are difficult to detect.

J. W. W. Stephens and his colleagues[20] discuss the value of differential leucocyte counts, and agree with previous observers that mononuclears are in excess in the centre of the film and polynuclears at the edges and tongue areas, but found that the edge area counts agree most closely with the count in a whole film ; but they found that there was a considerable margin of error in counts of 250 or more leucocytes, which still remained as high as 4 per cent in counts of 1000 and more, and so consider the method is not as simple and reliable as it has hitherto been thought to be. W. Broughton-Alcock[21] has made numerous leucocyte counts in pension malarial cases to ascertain if a large mononuclear increase is of value in detecting chronic malaria in the absence of parasites in the blood ; but the value was limited, as the increase soon disappears.

Lucey[21] found that the first drop of blood from the ear gave high large-mononuclear counts in normal persons, owing to stasis of the circulation there, but a second drop gave reliable results.

The Wassermann test in malaria has been still further investigated in Java by L. H. Heherwert and W. A. Kap,[22] who obtained positive reactions of a high degree in 50 per cent with heated serum and 95 per cent with unheated serum, while controls without syphilis or malaria gave 0 and 40 per cent positives respectively. The reaction in malaria may last 3 to 6 months, but disappears under efficient quinine treatment, so they conclude that a positive Wassermann is of little value in a highly malarious country within three months of a malarial attack. K. R. K. Iyengar[23] discusses the same question, and comes to the opposite conclusion, that malarial infection and quinine treatment do not affect the Wassermann reaction.

TREATMENT.—L. S. Dudgeon[24] records the results of experiments made in Salonica to determine the effects of injections of **Quinine** on animal and human tissues, and shows that both concentrated and dilute solutions of practical utility produce necrosis and œdema, but are rapidly absorbed even by patients *in extremis*. The tissue necrosis occurs immediately, persists for a considerable period, and may produce a fibroneuritis ; while necrosis of blood-vessels, producing small, and occasionally severe, hæmorrhages, frequently results. If injected near a nerve trunk, palsy may occur, with degeneration of the nerve. Similar results occur in malarial subjects, and repeated intramuscular injections should not be given in the same area of muscle or in the adjacent tissue. H. W. Acton[25] has studied the action of quinine on the pregnant uterus in animals, and found that solutions of a strength corresponding to that which results in the human subject from taking moderate doses have little or no effect on the uterus, while more concentrated ones cause contraction of both the longitudinal and circular fibres, which will not produce abortion unless the os is already dilated. This is in agreement with clinical experience that moderate doses of quinine will not induce abortion, but in malarial subjects may prevent it by curing the toxic febrile condition. In pregnant patients the dose should be only 2½ to 5 gr. repeated frequently up to a total of 20 gr. a day. U. N. Brahmachari[26] has made clinical observations on the effect of intravenous injections of quinine on the blood-pressure, and concludes that concentrated solutions produce more severe falls than dilute ones, and he advises a 1–300 solution given slowly, taking thirty minutes over a full dose, which would make it impracticable in many cases.

L. R. DeBuys[27] points out that an important factor in the success of anti-malarial treatment is to examine all persons living in the same house as the patient and to treat any suffering from malaria, as otherwise an apparent relapse and failure of quinine treatment may really be a new infection, as in cases he records. Many apparent failures are best explained by this factor, especially in highly malarious places. J. W. W. Stephens and others[28] record an analysis of the hour of onset of clinical signs of a benign tertian malarial paroxysm, and found most to begin between 2 and 3 p.m., while 93·5 per cent occurred in the day between 7 a.m. and 6.59 p.m.

J. Pratt-Johnson and K. Gilchrist[29] discuss the treatment of malaria based on cases controlled by over 18,000 blood-tests in South Africa, and agree with other observers that benign tertian cases relapse more than malignant tertian ones, while mixed infections are the most resistant to treatment. The standard treatment adopted after much experience was 10 gr. of **Quinine** in solution three times a day for three weeks, 10 gr. twice daily for one month, and 10 gr. once a day for two months. A chart shows a reduction in time in hospital coinciding with an increase of quinine given. Syphilis increases the resistant power of malaria to treatment. The average parasite relapse intervals were 14 days in benign tertian and 12 days in malignant tertian infections, while the average persistence of the crescents under 25 gr. of quinine daily was 15 days, showing that efficient quinine treatment also clears up the sexual parasites. P. Hehir[30] records that his experience in India is in agreement with that of the authors of the last paper. J. Pratt-Johnson, K. Gilchrist, and H. Michel[31] also report on trials of other drugs in malaria, and found that **Salvarsan** and its modifications in moderate doses exert a marked parasiticidal action on benign tertian parasites, but not on malignant tertian ones, although the latter are rendered more vulnerable to quinine, so the combination is also valuable in resistant and anæmic cases of the latter; **Soamin** subcutaneously acts to some extent in the same way; while tartar emetic had no demonstrable action on any stage of malarial parasites, and mercury inunctions were also useless in malaria.

G. N. Pitt[32] advocates the intravenous injection of 12- to 15-gr. doses of quinine in 15 c.c. warm saline as the most effective and safe method of treatment, followed by oral use for a month. Ronald Ross[33] discusses the principle of repeated medication for curing malaria and other infections, and insists on the long continuation of the drug without a single day's omission, in order to exhaust the infection, in doses of not less than 10 to 15 gr. a day for months, three months usually being sufficient, larger doses being given for one or two weeks after any actual attack of fever. In an experience of 24,000 cases of real or alleged malaria in the Pensions Clinic, the large majority have been finally cured by this method.

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MALTA FEVER.

Sir Leonard Rogers, M.D., F.R.C.P., F.R.S.

P. W. Bassett-Smith[1] writes on *para-melitensis* in man and in animals, having worked with a strain supplied by Nicolle from Tunis, although originally cultivated by Bruce. It had been widely distributed and agglutinates irregularly, having probably accounted for many reported contradictory results. Four cases in man seen by him seemed to show a greater toxicity than the ordinary form and greater liability to secondary infections, one showing after death secondary streptococcal infarcts in the spleen.

REFERENCE.—[1] *Jour. Trop. Med. and Hygiene*, 1921, 53.

MASTOID DISEASE. (*See* EAR, MIDDLE, DISEASE OF.)

MATERNITY AND CHILD WELFARE.

Joseph Priestley, B.A., M.D., D.P.H.

Milk Assistance Scheme.—The Milk Order 1919 proved in practice as successful as in theory, and many lives of infants were saved in consequence; many expectant and nursing mothers, and children between one and five years of age, benefited in health. The Order was somewhat limited in its application, being restricted to *necessitous* cases (using the adjective in a Poor-law sense), and an amended Order, known as the Milk Order 1920, was issued, with a wider application, so as to include cases which were certified medically as requiring milk on the grounds of health, due regard being paid also to the retail price of milk at the time. The net result in practical working of these two Milk Orders has been the saving of infantile lives and the bettering of health of children between one and five years of age and of mothers (expectant and nursing), whilst no excessive expenditure was thrown upon local rates, as the Government gave a subsidy up to 50 per cent in each case, subject to efficient and approved local administration. Local estimates varied considerably, but in some of the larger districts, where the Orders were seriously administered, the estimates for the year 1921–22 were as much as £30,000 to £80,000. Then came the 'economy craze' and a bolt from the blue in the form of an official communication from the Ministry of Health, stating that the Government subsidy was to be reduced from 50 per cent to 7½ per cent during the second half of the financial year 1921–22, and to 5 per cent afterwards! It must be remembered that local estimates had already been passed and the necessary local machinery was already in full work, milk committees and officers having been appointed. Local authorities were stunned. There was only one thing to be done; that was to appeal to the Ministry of Health at once, and this was done by communications, resolutions, questions in Parliament, etc., with the gratifying result that the Government decided to continue the 50 per cent subsidy, at least to the end of the financial year 1921–22. What will happen after that date remains to be seen. It is to be hoped that anti-waste considerations will not be allowed to blind the Government and prevent it from seeing that, in the case of health, what may appear to be waste is really the opposite. If not, the public health will suffer, especially the infantile and child life, in increased mortality and morbidity rates. A more short-sighted policy it would be difficult to conceive. Economic considerations are worthy of serious attention at all times, and especially to-day, but not at the expense of the public health. Free dinners for expectant and nursing mothers are also being suggested by the Government as an alternative (less expensive) scheme.

The Value of Dental Clinics.—All experience goes to show the actual and potential value of the dental clinic from birth (including ante-birth) onwards. Many ailments are directly due to bad teeth, e.g., ear and eye troubles, glandular enlargements, anæmia, neurasthenia, joint affections, intestinal complaints, etc. It is necessary to begin at the beginning, by providing the dental clinic in connection with maternity and child-welfare schemes. The expectant mother comes in for attention: her mouth is made healthy, and no septic absorption can affect either her or her offspring (unborn). The child passes to school age and is transferred to the dental clinic for school children (the great need for which has been proved by statistics issued by the Board of Education). Then the scholar passes to adult age and becomes one of the millions of workers. Where is the dental clinic for adults? Where is Britain's National Dental Service? The adult dental clinic should be self-supporting, so that there is no legitimate excuse on the grounds of economy and anti-waste for adults not being properly provided with dental clinics and a National Dental Service.

Without adult dental clinics it is clear that the expenditure on maternity and child welfare and school dental clinics is wasted, at least to a very large extent. Teeth require constant periodical attention, and ex-scholars should be catered for by the inauguration of some sort of national insurance dental organizations. In that way only will the system of dental treatment be made complete, and the present alarming state of affairs (stated as two in every three teeth being defective) improved, with enormous benefit to the public health.

MEASLES.

J. D. Rolleston, M.D.

Pathology.—The experiments of F. G. Blake and J. D. Trask[1] confirm the contention of J. F. Anderson and J. Goldberger (*see* Medical Annual, 1912, p. 393; 1913, p. 349) that the monkey is susceptible to measles. Monkeys (*Macacus rhesus*) were injected intratracheally with unfiltered or filtered nasopharyngeal secretions from cases of measles in the prodromal or early eruptive stage, and after an incubation period of from six to ten days reacted with a group of symptoms closely resembling measles in man, viz., drowsiness, conjunctivitis, photophobia, Koplik's spots, enanthem, exanthem, leucopenia, and frequently fever. The disease was transmitted readily from monkey to monkey through a considerable number of generations by suspensions of skin and buccal mucosa prepared from monkeys killed shortly after the appearance of the exanthem; by nasopharyngeal washings collected during the prodromal period; by citrated whole blood, defibrinated whole blood, by serum injected intravenously, subcutaneously and intratracheally, and by intimate contact infection. The development of immunity was also investigated. Six monkeys which had had an attack of the experimental disease were reinoculated at periods varying from 12 to 254 days after recovery, in four cases intravenously and in two intratracheally, and none showed any evidence of infection. Lastly, histological examination of the lesions showed that they were essentially the same as those of measles in man.

Epidemiology.—Apert and P. Vallery-Radot[2] state, that during 1920, 642 cases of measles were admitted to the Hôpital des Enfants Malades, Paris: 558 were discharged cured, so that the mortality was 13·08 per cent. Although this figure is high compared with the mortality from measles in private practice or private hospitals such as the Hôpital Pasteur, where it is hardly ever above 4 or 5 per cent, it compares favourably with that of the children's hospitals of the Assistance Publique, in which it ranges from 15 to 20 per cent. In previous years the mortality in the old measles wards at the Hôpital des Enfants Malades was much higher, viz., 33 per cent in 1890, 25 per cent in 1899, 23 per cent in 1900, and in some years as high as 48 per cent, so that a great improvement had been effected by the opening of a new measles pavilion.

Among those admitted in 1920, 118 cases were complicated by bronchopneumonia, which was present on admission in 72 and in 46 developed later. Of the 72 cases, 52 died—a mortality of 72·2 per cent; and of the 46 cases, 22 died—a mortality of 47·82 per cent. The great majority of the fatal cases were in children under two years or in those suffering simultaneously from measles and whooping-cough.

SYMPTOMS.—J. K. Friedjung[3] reports five examples of the *immunity of breast-fed infants to measles* in spite of the absence of isolation, in families where the disease was prevalent during an extensive epidemic in Vienna in the spring of 1918. He adds, however, that he had seen numerous cases of measles among breast-fed as well as among bottle-fed children, so that the rule as to the immunity of breast-fed children to infectious diseases in general and measles in particular is by no means of universal application.

E. Schulze[4] reports a typical case of measles in a breast-fed infant whose mother had suffered from the disease fourteen days before its birth. He alludes to a similar case reported by Mairinger in which the mother's eruption was present at birth. Although the infant was isolated at once, it developed a typical attack of measles fourteen days after birth. Cases of measles in breast-fed infants from one to three months old infected by their nurses are also reported by M. A. Ugón.[5] In each case the disease was extremely mild in spite of the severity of the nurse's attack.

From a study of an outbreak of measles in an infants' ward, M. Baur[6] found that the disease was only contagious during the catarrhal period and the first day of the eruption, the greatest danger of infection being in the transition stage between the prodromal and eruption period.

Prolongation of the incubation period in measles by the coexistence of intercurrent infections is illustrated by M. Baur,[7] who records six cases in which the duration of the incubation period, owing to an intercurrent attack of scarlet fever or varicella, ranged from fifteen to seventeen days.

R. Monteleone[8] records a case of *abscess of the right frontal lobe* in a girl, age 17, secondary to empyema of the frontal sinus caused by measles. Recovery followed operation.

PROPHYLAXIS.—According to A. Pfaundler,[9] the duration of the immunity conferred by the injection of convalescents' serum (*see* MEDICAL ANNUAL, 1921, p. 307) is not yet determined, but in any cases it is a question of months. If the injection is given late in the incubation period—about the fifth or sixth day—a combined passive and active immunization is effected, the duration of which is considerably longer. Pfaundler states that no bad effects have been observed among the many hundred children who have received prophylactic injections of convalescents' serum. No symptoms of serum disease or anaphylaxis were noted. The method is of special value in institutions, especially infant homes and crèches.

TREATMENT.—C. Arrigoni[10] has found that injections of **Pilocarpine** in cases of œdema of the glottis secondary to measles have surprisingly successful results, so that they should always be employed in such cases before surgical treatment, such as intubation or tracheotomy. When the heart is acting feebly it is important that the pilocarpine should be combined with cardiac tonics (*see also* MEDICAL ANNUAL, 1910, p. 49).

REFERENCES.—[1] *Jour. Amer. Med. Assoc.* 1921, ii, 192; [2] *Bull. Soc. de Péd.* 1921, 24; [3] *Med. Science*, 1920, iii, 137; [4] *Deut. med. Woch.* 1921, 271; [5] *Brit. Jour. Child. Dis.* 1921, 100; [6] *Münch. med. Woch* 1921, 736; [7] *Ibid.*; [8] *Policlinico* (Sez. Prat.), 1921, 616; [9] *Münch. med. Woch.* 1921, 277; [10] *Policlinico* (Sez. Prat.), 1920, 1150.

MEGACOLON. (*See* COLON, SURGERY OF: HIRSCHSPRUNG'S DISEASE.)

MENINGITIS.

J. Ramsay Hunt, M.D.

Tuberculous Meningitis.—The question of the curability of tuberculous meningitis is considered by Harbitz.[1] The usual prognosis in such cases is that it results in death in a comparatively short time.

When choroidal tubercles came to be recognized by means of the opthalmoscope, the diagnosis of tuberculous meningitis became more certain. A still better means was furnished by lumbar puncture, which made it possible to demonstrate the presence of tubercle bacilli either directly or by inoculation of guinea-pigs. In 1914 Bokay collected no less than 29 such cases, including 2 of his own. Altogether the total number of cases of healed tuberculous meningitis, concerning the diagnosis of which there can be no question, becomes about 40. Harbitz reports a case in which the meningeal lesions were regressive and showing a tendency to heal. The autopsy showed enlarged lymph-nodes in the neck, along the trachea and bronchi, and in the hilus of the lungs, some nodes being sclerotic and calcified. The case is characterized by a certain definite chronicity, shown particularly by the absence of any exudative changes. That the process at one time was exudative is indicated by the presence of scar-like areas in the membranes and thickening with hyalinization of the walls of blood-vessels.

From the results of the observations at hand it may be concluded that tuberculous meningitis may heal, and even in cases in which rather extensive lesions with exudate and tubercle formation have developed. This may depend on the nature of the infection, and it seems that this curable form of meningitis has occurred largely in persons who have suffered from chronic and relatively benign forms of tuberculosis. It is probable, however, that a more important factor is increased resistance of the body, which bears some relation to the age of the patient.

Blastomycotic Meningitis.—N. Watanabe[2] reports a case of this disease. There are many reports of the diseases caused by blastomycetes, but the blastomycotic infections of the central nervous system are very rare. The writer found only two reports: that of Hansemann which was recognized at necropsy, and that of Türk which was diagnosed clinically as a blastomycotic infection. Watanabe observed in 1912 a case of blastomycotic cerebrospinal meningitis in which numerous blastomycetes were discovered in the spinal fluid and were obtained in pure culture. At necropsy they were found in the lateral ventricles, the meninges, and in the other organs. He reports in detail the clinical observations, and the results of the histological and bacteriological researches and the experimental studies on animals.

According to the literature the mode of the infection is quite obscure. A large majority of the reports of the blastomycosis have had skin diseases in the previous history. Türk reported blastomycetes in the tonsils of his case, but it is not clear whether they invaded the parenchyma of the organs or not. Watanabe regards the tonsils as the primary focus in his case. He notes that in all cases (Hansemann, Türk, and Watanabe) tuberculous foci were found in the lungs and other organs, while no blastomycetes in the lungs were found.

References.—[1]*Amer. Jour. Med. Sci.* 1921, Feb., 212; [2]*Mitteil a. d. Med. Fak. d. Kaiserl. Univ. Kyusha,* 1919, Bd. v, Heft 1, 1.

MENTAL DISEASE.

C. Stanford Read, M.D.

Modern psychological theories are gradually moulding the outlook of most psychiatrists on mental disease, and Stoddart, in the last edition of his textbook, frankly states that his conception of the pathology of the so-called functional psychoses has completely altered. Such an authoritative neurologist as Farquhar Buzzard[1] states that " psycho-analysis is as necessary for the study of psychiatry as accurate and patient history-taking is necessary for the elucidation of medical problems of organic origin." We should bear in mind the remarks of Myerson[2] when he says, " The term insanity is essentially a legal conception, and has hampered the psychiatrist who deals with mental disease and includes in this category on an even basis the so-called psychoses and the so-called psychoneuroses. . . . Insanity and commitability are legal and therapeutic matters and not diagnostic. The term 'neurosis' is regarded as a pure euphemism, for most cases of psychasthenia and hysteria are entirely mental, and as truly psychotic as dementia præcox, and much more so than general paresis ". At any rate, we are fast getting away from the idea that heredity is everything, which has rendered the outlook in mental disease so hopeless, and have learnt that early environment and experience are enormous factors in the production of abnormal states, so that prophylaxy may do much. At the last annual meeting of the British Medical Association, Professor Robertson[3] deplored the present-day legal restrictions, and made an excellent plea for the emancipation of the mental hospital and the introduction of a new era for it, where early diagnosis and treatment could be undertaken and thus the term 'hospital' become fully justified. The lessons learnt from the war have stimulated France to progressive measures, and H. Colin,[4] in a paper on mental hygiene and prophylaxy, refers to the various reforms needed in study and which will be set in action by the " Ligue d'hygiène mentale ", which was initiated in France in December, 1920. This movement will evidently be much on the same lines as the National Committee for Mental Hygiene which has done and is still doing such fine work in America. We must earnestly hope that England will soon follow suit. That legislation is so much in arrear of the real necessities of the recognition, care, and treatment of incipient insanity is patent enough, and this point is insisted on by W. Caroleu,[5] of Barcelona, who states that in his country legislation is even less liberal than in England, is wholly out of date, and saviours of archaical conceptions of insanity.

Highly stimulating work has been done by Kempf,[6] of Washington, who is an ultra-behaviourist in his ideas. He is a believer in the James-Lange hypothesis of the origin of the emotions, and excellently tries to correlate the physiological and psychological aspects of mental disease. The essence of Kempf's thesis is the translation of the wish—established by Freud as the unit of psychological process—into terms of indefatigable visceral tonus and postural tensions compelled by autonomic-affective cravings. His is a commendable attempt to explain the organic physiological foundation of the wish, and certainly provides a practical and monistic conception of personality. The same forces that, when harmoniously integrated, build up a personality, cause, when unadjustable conflict occurs, its deterioration ; and Kempf, as a result of his observations, gives us a mechanistic classification of neuroses and psychoses based upon the psychopathic affective difficulties and their attitude toward these. This classification is a great advance upon any previous systems, and his original works should be read by all interested in this branch of medicine. It is true that our present system of classification is by no means satisfactory, and on this point the ideas put forth by K. Birnbaum[7] are well worth noting, as he reviews mental disorders from a new standpoint which should yield a clearer and truer perspective of their relations and essential structure. W. Boven[8] concludes from his study that every psychosis is at the same time psychic and organic, and that these are but two aspects of the same *ensemble* of phenomena. A toxic factor may be suspected without thereby denying the importance of the rôle played by the primitive character in determining the clinical picture of a psychosis. The two factors are truly complementary to one another. Character gives the individual formula to the somatopsychic equilibrium. It discloses weak spots long before the outbreak of a psychosis, and so a knowledge of the primitive character of the insane is a matter not only of interest but of importance.

A biological view-point with regard to mental symptoms is gaining ground, and S. A. Silk[9] gives some excellent illustrations of the compensatory mechanisms of delusions and hallucinations through which biologically inefficient individuals aim to adjust themselves as social units. Just as bodily defence mechanisms, if continued for too long, may cause individual exhaustion and death, so at the psychical level delusions and hallucinations are defence mechanisms and may lead to a similar end. An analysis of the hallucinations in a case of schizophrenia by H. Devine[10] shows well, in a most interesting way, this conception of compensation, while E. Mapother[11] points out the not uncommon connection between delusions and early phantasy life.

Dementia Præcox.—The term 'schizophrenia' instead of 'dementia præcox' is finding more favour with modern psychiatrists who regard the conception, as initiated by Bleuler, of psychological dissociation as a basic factor of great importance. Bleuler's views in this respect are well and critically reviewed by Minowski,[12] of Paris. The views of Mott concerning changes in the central nervous system and reproductive organs are well known and were dealt with in the previous issue of the ANNUAL. Matsumoto,[13] a co-worker, has confirmed many of Mott's findings. He examined the testes of twenty cases of dementia præcox, and found, according to the stage of the disease, a gradual diminution of spermatogenesis up to complete arrest. Other chronic mental diseases did not appear as a general rule to bring this about, and he concludes that the regressive atrophy is primary in origin and not due to any secondary disease. He thinks that the regressive atrophy of the sexual organs may be the *fons et origo* of a disturbance of the normal balance of the internal secretions, and thereby engender auto-intoxication or disturbance of the normal nutritional equilibrium of the nervous system. However, removal of the reproductive organs in adolescence is not followed by dementia præcox, so that it is more probable that this disease is a manifestation of a germinal deficiency, and that the neurones thereby undergo a premature decay. The other hypothesis is that the defect in the germ-cells may lead to a disorder in the balance of the endocrine functions with resulting hypofunction and decay in the neurones from a disturbance of their normal nutritional equilibrium. There is some evidence of this, but further investigations are required.

Holmes[14] follows Monakow and Kitabayashi in regarding dementia præcox as an autotoxæmia through the action of intestinal bacteria. The patient has a spasmodically occluded colon which permits the process of decay to be very far-reaching, and various somatic signs point to this origin. The toxin closely resembles histamine, and the author endeavours to show that histamine-like substances (ergot) may produce deteriorating conditions similar to dementia præcox. He would therefore advocate appendicostomy and prolonged daily irrigation of the cæcum, though no other means of restoring the patient should be neglected.

Chronic bacterial infection as a factor in the causation of dementia præcox has been inquired into by Ford Robertson,[15] and his findings are based upon a study of 32 cases. He recognizes three main types of dominating infection —the pneumococcus, the neurotoxic diphtheroid bacillus, and the anaerobic streptothrix. He describes what is known of the pathogenic action of these agents as they affect persons outside asylums, thus demonstrating their neurotoxic action. In his dementia præcox cases, 7 were of the pneumococcus type, 9 of neurotoxic diphtheroid bacillus, and 13 of the anaerobic streptothrix type. Only three could not be put in any of these categories, and mixed types were the rule, though one infection predominated. In Robertson's judgement these chronic infections are the direct cause of the morbid process in the brain that destroys its efficiency, though special inherent reactive qualities of the patient and psychic traumatism are other important factors. In dementia præcox victims there is a special type of inherent defective resistance to the action of bacterial toxins, and this is specially so on the part of the association centres. It is not a question of a specific infection causing the disease. The proof will lie in employing **Therapeutic Immunization** against the infections in a series of early cases, before the brain is irretrievably damaged, and observing if the mental disorder is arrested. Little has yet been done on these lines, but improvement has been noted in at least seven cases in the series, and four have been discharged recovered. Other investigators have reported favourably on this line of treatment.

The organic basis of dementia præcox is accepted by A. E. Gurd,[16] who considers that the organic changes and its clinical course show that the disease has a special localization in the central nervous system, causing degenerative changes which may be continuous, but probably more frequently are intermittent, corresponding with improvement or remission of the symptoms. Oscar Lessing[17] insists on the need for investigation of the rôle played by the internal secretions. Schizophrenia (Lessing prefers this term) is regarded as a more or less firmly established disturbance of the whole endocrine system, but 'dysfunction' is more to blame than 'hypofunction': in addition, however, there is a loss of normal balance in the system. Both of these factors perhaps may be found ultimately to depend upon a disturbance of the vegetative nervous system which regulates the activity of all internally secreting organs.

Sir Arbuthnot Lane includes dementia præcox among the conglomeration of diseases, which, according to him, are traceable to coprostasis. Stanford and Goodall[18] have studied the passage of a barium sulphate meal in ten cases of this mental disorder, and found in six out of the ten there was delayed evacuation of fæces in the large bowel; in one case ptosis of the large bowel; and in five there was spasticity of the colon.

From urinary investigations, J. Walker[19] thinks it worthy of notice that in all of the cases of dementia præcox he examined there was a moderate to a marked degree of acidosis, and a low concentration of urea in the urine, with polyuria. He thinks that this may be due to either a disordered protein metabolism or some form of endocrine disturbance implicating more particularly the pituitary gland.

The mechanisms involved in dementia præcox are discussed from a purely psycho-analytic standpoint by M. K. Isham,[20] who says the paraphrenic has not been able to pass comfortably through the stage from self- to object-love, and so later, in the face of conflict, he regresses to an auto erotic stage where a satisfying adjustment was first made. Narcissism is never carried through with sufficient integrity to keep from bothering the paraphrenic in adult years. Through analytic study of war cases, Lazell[21] states that when a man cannot renounce his egotistical ideas of self-preservation and the lower loves on which this is based, and society and his own self-respect demand this renunciation, the onward flow of the libido is blocked and he regresses to some stage of his infantile existence. He may then shut out conscious activity regarding sexual ideas, dwelling on them only in phantasy, the hebephrenic solution, or he may return to the normal, forgetting the whole experience. Complete regression involves a cessation of rebellion against the sexual infantile ideas, and in this the patient is comfortable, but will not recover while in such a state. All cases of schizophrenia breaking down from the strain of war recover unless a new obstacle is encountered. If by adjusting to reality the patient finds himself in a third intolerable situation, he does not recover.

Examples of dementia præcox occurring in different members of the same family are not uncommon, but some interesting instances are given and discussed by Laignel-Lavestine.[22] The same observer, with Boutet,[23], records this disease in twins.

Working at a large naval training station where psychiatric cases were seen very early, H. S. Hulbert[24] made the following observations with regard to auditory hallucinations in dementia præcox: (1) Unilateral localization of the hallucinations was frequently found in early or acute cases, and is not found in other conditions without some organic disease of the nervous system or of the auditory apparatus; (2) Hallucinations are usually first localized on one side, then become bilateral, with different characteristics on the two sides, subsequently becoming bilateral with similar characteristics on both sides, and finally cease to bother the patient or cease to exist; (3) The continuance of unilateral auditory hallucinosis suggests that the case remains acute.

Manic-depressive Psychoses.—Not only do Parhon and Stocker[25] note the intimate relationship existing between psychic functions and the internal secretion glands, but they believe that a hyperfunction or perversion of the thyroid activity is responsible for many cases of the depressive form of manic-depressive insanity. In support of this thesis they draw attention to the co-existence of anxious depressions with Basedow's disease and other thyroid disorders; their greater frequency in women, and their relation with the special epochs of puberty, pregnancy, and the menopause; the frequency of arteriosclerosis in manic-depressive insanity; the relative increase in the mean weight of the thyroid in these psychoses; the hyperexcitability of the vegetative nervous system in such patients, just as it is easily invoked in hyperthyroid states. From a woman patient suffering from 'mélancolie anxieuse' the right lobe of the thyroid was removed. Marked pathological changes were seen macroscopically and microscopically. Though the authors are disposed to admit that these glandular changes have followed the psychic troubles, they ask whether they are not responsible for the persistence of the melancholic and anxious state of the patient. They regard thyroid changes as frequent in melancholia, and quote other workers who have similar findings to report. In two cases a transient depressive state appeared after partial thyroidectomy had been undertaken to relieve some symptoms of maniacal excitation, and in certain cases of melancholia **Thyroid Treatment** has been reported as bringing happy results (Pilcz, Loeper, Gautier). In the special case related in this article partial ablation of the thyroid had a beneficial influence. The conclusion is therefore come to that there is an intimate connection between thyroid troubles and the melancholic syndrome. It seems possible that an error in the quantitative (and qualitative ?) optimum of thyroid secretion, either in the sense of diminution or augmentation, is capable of determining the melancholic syndrome. Pre-existing soil must also be taken into account, as well as the functioning of the other endocrine glands.

From the *psycho-analytic standpoint* Freud[26] has thrown light on the psychological mechanisms involved in melancholia. He states that the self-accusations with which melancholic patients torture themselves in the most pitiless way really apply to another person, namely, the sex object which they have lost, or which through some fault has lost value for them. From this we may conclude that the melancholic has withdrawn his libido from the object. Through a process which is designated 'narcissistic identification' the object is built up within the ego itself, so to say, projected upon the ego. The personal ego is now treated in the same manner as the abandoned object, and suffers all the aggression and expressions of revenge which were planned for the object. Even the suicidal tendencies of melancholia are more comprehensible when we consider that this bitterness of the patient falls alike on the ego itself and on the object of its love and hate. In melancholia, as well as in other narcissistic conditions, a feature of emotional life is strikingly shown which we have been accustomed to designate as ambivalence. By this is meant that hostile and affectionate feelings are directed against one and the same person. With regard to the *delusion of being watched*, Freud also gives a psychological explanation. In the ego there is really an agent which continually watches, criticizes, and compares the other part of the ego and thus opposes it. When the patient complains that his actions are spied upon, he errs only in transferring this force to something outside of himself. He feels the dominance of a factor in his ego which compares his actual ego and all its activities with an ideal-ego that he has created in the course of his development. In this self-observing agent we recognize the ego-censor, the conscience. Under analysis the delusion of being watched is found to originate in the influence of parents, tutors, and social environment, and in the identification of the ego with certain of these model individuals.

In an interesting contribution Alfred Carver[27] has published a brief analysis of a case of melancholia wherein he shows that the mental mechanism involved is almost the direct converse of that exhibited by the paranoiac, and finds himself unknowingly confirming Freud's conceptions. At the conclusion of his analysis he states that he does not claim that the mechanism revealed can account for all so-called melancholic states, but he is led to believe that the underlying factor in such a condition is a failure of re-adaptation to an environment, which, owing to a certain deprivation, has been rendered void of interest. Individuals with a sulky character respond to this neurotically by a physical and mental inertia, and defend themselves by displacing the reproach from the environment to the ego. There is further an identification of the self with a beloved person who is blamed for having caused the deprivation.

Manic-depressive psychoses have also been studied by Lucille Dooley,[28] who has endeavoured to determine whether or not psycho-analysis could be applied to the severe cases with beneficial results, and also to trace the symptoms back to phases of character development and to the specific crisis in the lives of the patients where the arrest of emotional growth occurred. Confirmation of the view is found that the manic psychosis is the result of mental or emotional conflicts and repression, being of the compensatory type. The manic in his excitement speaks out quite frankly the wish that is kept out of even his secret conscious thought at other times.

Paranoid Psychoses.—Freud's theory that paranoia is founded upon repressed homosexuality is now well known and has been confirmed by many observers. Stanford Read,[29] in his paper on homosexuality, drew attention to this, and put forward the hypothesis that the herding together of vast numbers of men may have to some extent been responsible for the large number of paranoid war psychoses he saw, through the arousal of latent homosexuality. Psychoanalytic investigation has led Aug. Stärcke[30] to think it probable that an unconscious identification of the loved object with the skybalum (fæces) is present in the first instance, and that this identification provides the basis for the special ambivalency of the paranoic constitution. He found that the content of the persecutory delusion is frequently anal persecution. The skybalum is the primary (real) persecutor ; it commits anal acts of violence which are often at the same time acts of pleasure. J. H. W. Van Ophuijsen[31] writes much in the same way, and an analysis of a patient's dream suggested that the persecution may be an assault from behind (at the anus) on the part of a person (the father) with homosexual intentions. In another dream the persecutor and skybalum were treated as equivalents. Paul Bohnen[32] discusses four cases which tally very closely with the involutional paranoia described by Kleist in 1912, which he ascribed to the metabolic displacement resulting from failure of the sexual secretions. Some relatives of the patients showed evidence of manic-depressive disturbances, and Bohnen thinks that involutional paranoia is probably related to this psychosis.

Mental Disease and Syphilis.—Syphilis is frequently loosely spoken of as a causative agent, but its predisposing or exciting tendencies are by no means clear. Since the introduction of the Wassermann reaction as a more or less routine measure in examination, positive results have led observers to regard the presumed syphilitic infection as in some way intimately related with the mental symptoms. J. Allen Jackson and H. V. Pike[33] draw attention to this, and point out that while in certain of the psychoses syphilis may be regarded as the definite etiological factor, by far the greater percentage of cases owe their development to conditions far removed from *Spirochæta pallida.* In these cases the presence of a positive blood Wassermann reaction is indicative of syphilis simply as an individual condition in no wise contributing to the mental disorder, and hence, so far as the psychosis is concerned, does not demand antisyphilitic therapy. From the standpoint of syphilis as the exciting cause of mental disease, individual cases fall into one of two groups : (1) Cases which, while showing a strongly positive Wassermann blood reaction, do not present neurologic or spinal-fluid serologic evidences of neurosyphilis ; (2) Cases which, irrespective of the blood reaction, show clinical, neurologic, and spinal-fluid serologic signs of syphilis of the nervous system. In *Group* 1 should be placed three types of cases : (*a*) Psychoses in which syphilitic infection antedates the development of mental disease ; (*b*) Psychoses in which the mental disease antedates the syphilitic infection ; and (*c*) Epilepsy, mental deficiency, and psychopathic constitutional inferiority, with syphilitic infection either hereditary or acquired. *Group* 1 includes quite a large number of cases continually received into mental hospitals, and in which syphilis is given by the committing physician as the cause of the psychosis, so that relatives are led to believe that antisyphilitic treatment will bring about recovery. This is highly erroneous. The patient presenting a distinct history of syphilitic infection, together with the clinical evidence of systemic syphilis and a positive blood reaction, should receive antisyphilitic therapy ; but a positive blood reaction alone does not indicate such treatment, nor should one expect from it any great mental improvement in these types of cases. In *Group* 2 we can differentiate two types : (*a*) Psychoses in which syphilitic infection is limited to the vascular and meningovascular processes of the brain and spinal cord, and presenting the neurologic and spinal-fluid serologic evidences of cerebral, cerebrospinal, or spinal syphilis ; (*b*) Diseases of the brain and spinal cord in which syphilitic infection has involved the parenchyma of these organs, and showing the neurologic signs of paresis or tabes. This second group presents a stumbling-block to the neurologist and psychiatrist. The success in treatment of these conditions depends on the ability to reach the foci of infection and repair damage. In the parenchymatous form the therapeutic remedies fail to reach the infected areas, and so parasyphilis of the nervous system presents a hopeless prognosis. It is to be noted that periods of remission are often mistaken for results obtained from treatment. On the other hand, meningovascular neurosyphilis presents a good possibility of cure, and in such cases antisyphilitic treatment should be pushed to the limit. However, by the time these patients are first seen by the psychiatrist, as a rule the disease has reached the stage in which the rôle of syphilis exists in the past as far as treatment is concerned, so that early recognition and therapeusis are the more important.

Thom[34] draws attention to the fact that the syphilitic factor in psychoses other than paresis has received little investigation He quotes 23 cases which were long studied by Alfred Gordon, of Philadelphia. In 5 cases the psychosis developed in the secondary stage and the other 18 noted in the tertiary stage. In 3 trauma was recent, and Thom regards this factor as of some import. In the traumatic cases there were no hallucinations, but only a mild confusional state with some amnesia and slight evening delirium. In one case Korsakoff's syndrome was seen without any polyneuritis. The remaining tertiary psychoses were recorded as: 6 manic-depressives; 3 had paranoia; 2 showed involutional melancholia; and 3 displayed progressive dementia. Manic-depressive insanity, when due to syphilis, is difficult to diagnose from paresis. Lewis M. Gaines states he has seen idiocy, imbecility, mania, melancholia, dementia præcox, and paranoia all caused by syphilis, and he thinks that the psychic symptoms depend on the type of lesion and its anatomical site. It is believed that, though there is no psychosis pathognomonic of syphilis, there is no psychosis which cannot be caused by syphilis. These observations are of very doubtful value, and not only do the findings of Jackson and Pike already spoken of militate against them, but modern psychological research shows that other factors than these must be responsible for the type of psychosis developed. It also must not be forgotten that syphilis may be a psychic trauma, and thus may hasten an incipient psychosis or cause the development of such in those predisposed. Thom believes that a cure can be effected if early diagnosis is made and intensive treatment with salvarsan and mercury at once undertaken; but the mental scars remain, and the patient is never as well mentally as he was before. Most psychiatrists, however, do not share these optimistic views. J. Collins[35] truly points out that the minor mental and emotional changes accompanying syphilitic disease of the nervous system have received no attention at all. He attributes this to their variability both in severity and nature, but emphasizes how great an effect this may have on the career of the patient. He speaks of the results of adequate treatment, which sometimes restores function completely but often leaves behind it a scar which is only obvious to the patient's intimates and yet has a marked effect on his career, as for example when slight changes of emotional and intellectual capacity result from a syphilitic encephalitis.

P. W. Bedford[36] speaks of the intricacy of the Wassermann reaction for the detection of syphilis, and points out that the goldsol test, which consists merely in making a series of ten saline dilutions of the spinal fluid to be examined and adding thereto a small quantity of the goldsol reagent, is so simple that mistakes are difficult. He regards the test as a rough but easy method of demonstrating changes in the hydrogen-ion concentration of the spinal fluid, or it is an index of the static equilibrium of the fluid's colloidal content. Typical well-marked reactions are obtained only in general paralysis, tabo-paresis, and juvenile paresis, and in these diseases the percentage of positive reactions is 95. Bedford thinks this test is more sensitive than the Wassermann reaction, quite as reliable, and probably of more value in the early diagnosis of neurosyphilis.

Mental Disease and Alcohol.—As statistician to the New York State Hospital Commission, Horatio M. Pollock,[37] in investigating the effect of prohibition on insanity and drug-taking in New York, states: (1) The annual rate of the incidence of mental disease in New York State has decreased since 1917. (2) The annual rate of admissions of new cases of alcoholic mental disease to the civil state hospitals has greatly declined in recent years, and reached its lowest point in 1920. (3) The percentage of first admissions with a history of intemperate use of alcohol has declined since 1917, and was lowest in 1920. (4) The annual rate of new cases of drug insanity admitted to the civil state hospitals has declined in recent years.

Stanford Read[38] emphasizes the psychogenetic factors in the production of psychoses associated with alcohol. The unconscious motivation of alcoholic indulgence is the avoidance of mental pain, and the pleasure aroused by its imbibition is not exclusively physiological in origin; but its effect is to narcotize the higher mental processes and to permit the release of trends normally kept in check by the repressing force of social taboos. In the alcoholic psychoses the toxic effect of alcohol is not the chief causal agent but only a contributory one, and analysis nearly always reveals an emotional factor as the actual predisposing cause. Clinical pictures are not infrequently observed identical with those found in the alcoholic psychoses, in which a history of alcohol is absent. Alcoholic paranoid conditions, with delusions of jealousy, erotomania, persecution, and grandeur, are often found to depend upon a repressed impulse of a homosexual nature which in the psychosis finds an outlet by 'projection'.

Dobnigg and Economo,[39] in their analysis of twenty-three cases of dipsomania, found that it bore out the general impression that dipsomaniacs are psychopaths, and showed they could be grouped under three headings. About a third had relatives subject to epilepsy, another third had the predisposition to manic-depressive insanity, whilst the remainder could not be further defined, only general signs of degeneracy being present. Dipsomania was not regarded as a disease entity, but a symptom-complex occurring in psychopathic individuals whose relatives are usually themselves heavy drinkers.

Mental Disease and Influenza.—Karl A. Menninger[40] points out that the whole problem of the effects of acute infections on the brain and its diseases is a strangely neglected one, and he demonstrates certain definite effects that influenza had on hypophrenia (Southard's term for feeblemindedness). Influenza as a type of acute infection, with known neurotoxic potency, has in recent epidemics given opportunity for study, and the author here endeavours to combat the standpoint that hypophrenics are 'born, not made'. Inquiries addressed to superintendents of State hospitals for the feebleminded representing more than 16,000 patients, afforded but few results of importance, but data acquired from scanning specific cases encountered in private practice and neuropsychiatric dispensaries and hospitals brought out interesting conclusions. The uncomplicated cases represent: (1) Hypophrenia with aggravation of intellectual lack after influenza; (2) Hypophrenia with emotional-sphere disturbances notably intensified after influenza; and (3) Hypophrenia with volitional and conduct disorders conspicuously aggravated by influenza; to which may be added (4) A single instance of symptomatic improvement in all spheres, but notably that of intellect, following influenza. The complicated cases represent: (5) Hypophrenia with conspicuous neurologic manifestations after influenza; (6) Hypophrenia with psychotic manifestations following influenza; and (7) Hypophrenia with psychopathic manifestations prominent after influenza. Generic processes illustrated as to the rôle of the influenza are comparable with those observed in the study of the psychoses associated with influenza, namely, creation, precipitation, aggravation, and amelioration. Creation is imperfectly illustrated by two cases, both open to question. Precipitation is not illustrated at all, though the possibility is conceivable. The process of aggravation, however, was comparatively frequent, and is illustrated by the majority of the cases the author cites. Amelioration is illustrated by one case. In this, then, the relation of influenza to hypophrenia differs from that of influenza to the psychoses, since aggravation of the latter was the least frequently observed phenomenon, and in the case of hypophrenia the most frequently observed. The conclusion, therefore, is that the usual effect of influenza on the brain is not the production or precipitation of hypophrenia, and, if it ever produces it, it is probably by means of a more or less obvious encephalopathy. On the other hand, a few are adversely influenced by influenza, an aggravation which may be predominantly in the intellectual, emotional, or volitional sphere. Psychoses of an indeterminate type are occasionally precipitated by influenza in the feebleminded, even as in normal persons. At least, occasionally, though rarely, the effect of influenza may be symptomatic amelioration.

Menninger elsewhere[41] discourses on the relation between influenza and depression. Many people, after influenza, experience an emotional depression with general psychic depression for a greater or shorter period of time, but which is usually not severe enough to be regarded as a psychosis or neurosis. This used to be ascribed to cardiac incompetency, and since has been attributed to various physical anomalies, the most recent of which has been hypo-adrenalism. Feelings of lassitude, weakness, fatigability, incompetence, irritability, and melancholy were the main symptoms. After the epidemic of 1890–2 there were many psychoses in which depression was prominent, and it is probable that relatively more cases of manic-depressive psychosis were seen than following the recent epidemic. The great mass of literature agrees that depression was not a frequent symptom in the psychoses subsequent to the last epidemic, nor was the manic-depressive psychosis frequently noted. Menninger quotes eighteen cases, and concludes: (1) The question of emotional pathology as the product of influenza is a point of much practical and theoretical interest. (2) Depression has been regarded as an almost universal sequela of influenza, but three distinct types should be recognized. (3) Mild syndromes rarely severe enough to be regarded as psychoses and variously ascribed to cerebral toxæmia, cardiac incompetence, and hypo-adrenalism. (4) Severe depressions frequently terminated by suicide, which often being dependent on gross physical pathology, might be called reactive or symptomatic depressions; these were far more frequent in the epidemic of 1890–2 than later. (5) Typical manic-depressive attacks may be precipitated by influenza either as a first attack or as recurrences. (6) Cyclothymic depressions are more frequently precipitated than manic attacks, and are far more apt to be brought about as first attacks; the manic or mixed forms, on the other hand, occur in equal numbers as first and later attacks. (7) The occurrence of manic-depressive psychosis is, on the whole, relatively infrequent. (8) Depression as a symptom in the other influenzal psychoses was comparatively infrequent in the recent epidemics.

Mental Disease, Delinquency, and Crime.—That delinquency and crime are so often intimately associated with mental deficiency and psychopathic disorders has become more and more obvious from recent study. Healey's work in America among delinquent children is well known and his deductions are largely accepted. Sanger Brown[42] seems to share Healey's views largely, that mental conflict is a frequent source of delinquency in the young. Though he says it is difficult to group the causes of delinquency under general headings, it is possible to do so to some extent. (1) A fair number show a psychic nervousness which is the basis of their maladjustment, and this was often found to be aided by such physical causes as malnutrition and overwork. (2) A considerable proportion are mentally deficient, so that mental maladjustments are more prone to be engendered. (3) Some evince certain personal characteristic traits which often make it difficult for the child to get along unassisted in the ordinary surroundings. (4) There are the cases which are the product of the environment itself.

H. H. Goddard's observations[43] lead him to say that "much of juvenile misbehaviour is as surely due to a brain functioning badly on account of disease, as is similar conduct in an adult". Glueck, as psychiatrist to Sing Sing prison in New York, has done excellent work on the relation between mental disease and crime.

The importance of this subject is insisted upon by Norwood East,[44] who in an analysis of 141 criminals found that 34 were insane, 39 mentally defective and certifiable under the Deficiency Act, 17 mentally defective but not certifiable, 12 showed mental disorder not amounting to insanity, and 39 were classed as normal. That is, of the 141 cases, 102 showed some mental abnormality, while in many even of those who were classed as normal the condition leading to the offence was toxic, or the circumstances were suggestive of alienation.

Lieut.-Colonel E. V. Briggs,[45] of the American Army, speaks of the misunderstanding of the defective delinquent in the army, and points out how much he can be helped and ameliorated by more rational treatment. Berry,[46] taking a highly materialistic view of these questions, deals with the structure of the brain, and shows that the supragranular layer of the cortex constitutes the higher-level basis for the carrying on of the cerebral functions, and being the last layer to be evolved, the last to attain maturity, is consequently the first to undergo retrogression. On such grounds does he place a physical basis for a large proportion of crime. For instance, he states that in Deeming, the murderer, it is certain that all the animal depravities were displayed from the presence of an infragranular cortex with but little or no supragranular layer, and that Oscar Wilde, with both these cortical layers in excess of normal, had his supragranular layer exhausted by his literary efforts, "leaving the clamant cells of the now uncontrolled sex instincts of his infragranular layer to work their way into Reading gaol". Would that such abnormalities could be so simply explained away. A step further is gone by Browning,[47] who brings clinical and other evidence to endeavour to show that a region in the brain, sufficiently restricted in extent to warrant terming it a centre, exists which acts as controller of an individual's morals. He goes so far as to state that this centre is unilateral in the frontal lobe. His conclusions, however, can hardly be accepted.

Bryan Donkin,[48] who is a recognized authority on this subject, says that there is a notable number of law-breakers of all kinds, not only of those sentenced to terms of penal servitude, but also of those convicted for lesser offences, who are quite clearly the subjects of mental defect in some of its recognized forms and degrees. He would start with the assumption that all men are potential criminals, given the stimulus or temptation adequate to induce antisocial action. Manifold reasons are given for his opinion that "criminal conduct is dependent on the innate capacities of each individual as developed and actuated by the innumerable influences which act upon these capacities; and that the actual mental characters or qualities that we observe are the resultant of these factors". Donkin agrees with the more modern students of criminology that the proper understanding and treatment of criminals depends mainly on the careful study of the individual offender.

Moral Imbecility, which Henry Head aptly terms a 'police-court diagnosis', is one of the four statutory classes of mental deficiency. It is a condition which results in serious misconduct, presents great diagnostic difficulty, and concerning the nature of which there is much misconception and divergence of opinion. A. F. Tredgold[19] forms the basis of a discussion on this condition on its statutory definition in the Mental Deficiency Act, which defines moral imbeciles as "persons who from an early age display some permanent defect, coupled with strong vicious or criminal propensities, on which punishment has had little or no deterrent effect". He regards this definition taken as a whole as distinctly accurate. It must be noted that intellectual defect is not presumed, but a defect which may be shown in any of the complex faculties which go to make up the mind. As Mercier said, "They are merely clever fools." In order to understand the nature of the defect in moral imbeciles, the mental factors concerned in conduct must be understood; and so Tredgold explains how the primitive instincts of the individual have had to give way for the good of the community as society has gradually evolved, and speaks of the complex psychological processes which make up the higher mental level so needful for successful adaptation and which involves much more than mere intelligence. The briefest sketch of the psychological nature and evolution of the social sense is given, and it is shown that a very similar process takes place in the development of the individual as it did in the race. Misconduct appears at times to be the result of very pronounced or abnormal impulses; but it is more often probably due to a defect in those adaptive qualities to which we may give the term 'wisdom', and in the social sense. The former seems the more important, and stands on a higher developmental plane than does ordinary intelligence. Intelligence may be good, knowledge good, and a capacity to regulate acts according to the requirements of the moment may be present, but a lack of the sense of rightness or wrongness of those acts, incapacity to form a judgement as to their ultimate effect, and the inability to co-ordinate conduct to an ultimate advantage, constitute the defect known as moral imbecility. In the true moral imbecile this lack is permanent and the defect of potentiality is regarded as innate. The term 'early age' is admittedly indefinite, but by this is meant the age at which conduct usually begins to show itself, such as in adolescence, and in a considerable proportion of cases which Tredgold would regard as true moral imbecility it is not until after the age of twelve that any serious misconduct begins to show itself. With regard to the last term of the definition, it is wrong to suppose that the punishment must be in the legal sense. The infliction of any punishment which would suffice to deter the ordinary normal child from a repetition of the offence would be quite adequate, and would fulfil this term of the definition. A description of the moral imbecile need not here be given. Diagnosis is often difficult. The condition must be differentiated from ordinary delinquency where the misconduct is only occasional, and from a second class of case where the controlling faculties are only delayed. Misconduct may also be due to mental disorder, brain injury, or cerebral lesions due to disease. Stoddart differs from the opinion that the moral sense arises through the inheritance of an acquired instinct, and is instilled anew into every child by education. He regards it as an innate instinct developed through natural selection, and he draws attention to a class of patient who begins to commit immoral acts at puberty through complexes, and who is curable by psycho-analysis. These should not be treated under the

Mental Deficiency Act. Shrubshall prefers the German definition, "Those who do not possess the power of considering the results of their actions are termed imbeciles". To be evidence of abnormal mentality, the conduct complained of must have been abnormal in the surroundings of the subject. He thinks the true imbecile is no fool.

G. A. Auden,[50] in a paper on the school medical service in relation to mental defect, demonstrates that the only sound method of approach to the question of mental deficiency must be a teleological one, and that the distinction between the educational and the sociological standpoints is fundamental. The school is the best training-ground for experience in both these aspects. He, too, is more and more convinced of the paramount part which is played by the repressed complexes of childhood in the perverse conduct of children. A large group of children which supplies perhaps the majority of juvenile delinquents is that of the unstable children who exhibit emotional instability combined with normal or quasi-normal intellectual capacity. The feebleminded as a class exhibit emotional reactions and anomalies of the affective processes which are closely paralleled by the psychological characters exhibited by an unorganized crowd. Auden, therefore, thinks that there is a great present-day need for psycho-educational clinics where all children presenting abnormalities of educational progress or of conduct could be studied.

Suicide.—L. G. Lowry[51] has analyzed 46 attempts at suicide, and finds that 16 were cases of dementia præcox, 9 of manic-depressive insanity, 5 of psychopathic personality, 3 of psychoneurosis, 13 various. The direct causes of the attempt in 14 were depression; in 7 direction of hallucination or delusion; in 6 to escape persecution; in 7 to escape physical or mental disease or social unhappiness. The methods chosen in order of frequency were: cutting throat or artery, gas, poison, drowning, hanging, jumping from a height, swallowing foreign bodies, strangulation, shooting, and setting fire to clothing. All the cases were insane, psychopathic, or acutely alcoholic at the time of attempt. He thinks that normal people occasionally commit or attempt suicide.

TREATMENT.

Though drug therapy has not hitherto brought any good results, saturation of the nervous system with **Strychnine Sulphate,** using a 1 per cent solution in repeated doses, is spoken of favourably by Hartenberg[52] in the treatment of melancholia. He thinks that thereby a kind of organic crisis is engendered which stimulates nutrition, reawakens sensibility, invigorates the physical and the intellectual activity, and forces the patient out of his inertia and torpor so that he returns to normal life.

In favour of an extended *parole system* and *occupational therapy* without the walls of an asylum, A. J. Rosanoff and T. S. Cusack[53] make a special plea. They state that under average conditions it is possible to increase paroles to hitherto unrealized numbers with benefit to all concerned. Upon the initiative of relatives, many patients are paroled and discharged, but in the absence of external initiative they are often held for years or for life. In the New York State Hospital service in 1911 2·5 per cent of the total average were on parole, in 1918 the percentage was 5·4. On a special survey being made in the King's Park State Hospital for the purpose of seeking out patients who might be suitable for parole, the percentage was raised to 10·7, and the prospect is that a percentage of 20 will be reached and constantly maintained. This procedure has bettered the paroled patients, they have lived more happily in the outside world with the help of social service workers, and by earning money have gained increased self-respect, and in part at least relieved the cost of their maintenance. It seems impossible to predict for certain whether a given patient will get along well outside or not. No method of examination affords as trustworthy a means as does an actual trial.

Stanford Read,[54] after a visit to the Belgian town of Gheel, where for many centuries large numbers of the insane have lived a life of comparative liberty in care of the inhabitants but under medical supervision, was stimulated to recognize the fact that institutional care was not needed to anything like the extent usually supposed. Though the marvellous success of the Gheel Colony is due largely to the effects of tradition, there is reason to think that much more could be accomplished in England in the way of familial treatment if only the public were slowly but surely educated up to it. Unconsciously, at any rate, the 'lunatic' is still regarded as something alien and a subject of awe and fear, and hence segregation away from society is thought to be the necessary treatment. Jung believes that the worst katatonic states and the most complete dementias are in many cases products of the lunatic asylum, brought about by the psychological influence of the *milieu.*

F. E. Devlin[55] is a great advocate of occupational therapy, which he thinks will prove of incalculable benefit to patients as well as to the State. He suggests the training of nurses as occupational therapists.

At the Danvers State Hospital, W. A. Bryan[56] has attempted to rehabilitate chronic demented patients and fit them into some social group. Their degeneration is thought to be mainly due to habit deterioration. The principles of treatment are therefore : (1) By training, to prevent the formation of vicious habits before they can become fixed ; (2) To form new and better habits. The play instinct is the best opening for most, and through a change to better surroundings where work is done, the instinct of imitation may be stimulated. The acquisitive and constructive instincts properly directed bring wonderful results, while affection and sympathy greatly aid. Fear of social disapproval takes the place of punishment. Though no brilliant results are reported, no case was without some improvement.

Treatment on psycho-analytical principles has advanced both in theory and in practice. Freud[57] himself refers to the special success which is met with in the analysis of manic-depressive cases during their normal phases ; and Carver[58] has published a successful result in this disorder. David Forsyth[59] has contributed an interesting case of a youthful paranoid dement whom he seemingly got well through analytic treatment. Two articles constituting a superficial analysis of two psychotic cases are given by D. W. Fay,[60] where he plainly shows how psycho-analytic knowledge may help a psychiatrist to lead such patients towards recovery.

A fresh and suggestive note is struck by E. W. Lazell,[61] who has instituted a group method of treating præcox cases because of their inaccessibility. Such patients should be not merely assisted to a social adjustment, but more fundamentally re-educated by directing their instinctive demands into normal channels, not only compatible with the ego-ideal but also with the herd law. Only such patients as presented the same fundamental problems and were solving their difficulties in the same manner should be included in the same group. The first grouping was made according to the prominent symptoms presented, and it was found that all cases of dementia præcox can be placed in one or the other of two great groups—the aggressive and submissive homoerotic, conforming in a general way to the terms hebephrenic and paranoid. The advantages of the group method are stated to be : (1) The patient is socialized with regard to the fear of death and the sexual problem ; (2) The fear of the analyst is removed ; (3) Even those apparently quite inaccessible heard and retained much of the material; (4) Many develop a positive transference; (5) The patients discuss the lectures with each other, thereby adding to the force of the talks. The patient is regarded as accessible at all times to the correct manner of approach, and the term 'inaccessible' is only looked upon as a projection of our inability to understand the symptoms. During treatment many are made temporarily worse, but these episodes are constructive, and they emerge from the conflict on a higher level. The material presented them corresponds more or less with the problems faced by a child as he progresses in development, the talks being consecutively as follows: the fear of death; the conflict thus produced; the reactivation of infantile emotions and wish-fulfilments; explanation of the most common hallucinations; masturbation; self-love; homosexuality; inferiority and its causes; day dreaming, etc. In conclusion, Lazell advocates an extension of this method to defectives and young criminals, and feels that, in the hands of competent psychotherapists of the psycho-analytic type, the group method of treatment will prove a great advance on the methods now in use.

L. Dooley[62] is somewhat pessimistic concerning the psycho-analytic treatment of manic-depressive psychosis. He thinks that in the depressed phase the patient may be inaccessible from inability to bring his own thoughts to bear on the problem, while in the manic phase he is too distractible. In the normal period the thoughts and feelings of the disturbed period are repressed, so that a powerful resistance is encountered to recalling them. The personality of the manic-depressive is also an obstacle. Those who have frequent manic attacks tend to get the upper hand of the analyst, and, though the transference seems good, the analyst is only an appendage to the greatly inflated ego. With the other type there is danger in meddling with the repressions, and suicide or homicide may be the result of incautious delvings into the inner life.

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METHYL ALCOHOL POISONING. (*See* POISONING.)

MIDDLE-EAR DISEASE. (*See* EAR, MIDDLE, DISEASE OF.)

MORAL IMBECILITY. (*See* MENTAL DISEASE.)

MORPHINE POISONING. (*See* POISONING.)

MOUTH AND FACE, SURGICAL AFFECTIONS OF.

Sir W. I. de C. Wheeler, F.R.C.S.I.

Mixed Tumours.—G. B. New[1] deals with mixed tumours in these regions, and points out that the group, from a pathological point of view, has been widely discussed. They are usually referred to as tumours of the salivary glands, but they may grow in various parts of the face, mouth, and throat. He bases his paper on a study of 68 cases from the Mayo Clinic. In 1 case there had been a tumour for forty years, in 5 cases for more than thirty years, and in 22 cases for more than ten years. These tumours are ten times more common in the parotid region than in the submaxillary region. The tumours may be located in the pharynx, either laterally, or bulging the posterior pharyngeal wall. They are found not infrequently in the hard palate; much more rarely, in the soft palate. When in the parotid region they are freely movable at first, but after they increase in size they become fixed between the posterior margin of the ramus of the jaw and the mastoid region. The upper or lower lip—rarely the latter—occasionally become the site of mixed tumours. They always grow laterally, like a hare-lip; pathologically, they are often recorded as endotheliomata arising from the endothelium of the blood-vessel; clinically, it is impossible to distinguish these from sarcoma. Some authorities believe that mixed tumours originate from the glandular structure of the salivary glands, or from the ducts. Trauma of the latter may be a predisposing influence (Fraser). Mixed tumours of the pharynx may be removed either through the mouth or through the submaxillary and submental region. The incision is made down to the capsule, and the tumour is shelled out. This is often a difficult procedure through the oral route. (Preliminary laryngotomy should greatly facilitate the procedure.) New thinks that this type of tumour should not be classified as mixed tumour of the salivary glands, until there has been something to show that it is in fact related to these glands. The tumours may be present in various locations in the throat, mouth, and face. Recurrence after complete removal is rare.

Tumours of the Face.—Kanavel[2] gives the histories of three patients with tumours of the face, and discusses the embryology and pathology of facial tumours. Dermoid tumours are very common in the face. Epiblastic tissue is frequently 'turned in', to result at a later period in the development of a tumour, especially in the line of fusion. Certain tumours of the face, such as hæmangioma and lymphangioma, which occasionally occur about the angle of the mouth and upon the lips, are due to over-development of tissue normally present.

Of the tumours of the jaw which appear as the result of abnormal development of the fœtus, the most common is the odontoma. Epithelial odontoma, adamantinoma, and adenocarcinoma appear in young adults, most frequently near the angle of the jaw. They may begin near the alveolar border and project from it, or have their origin within the body of the jaw and cause a diffuse enlargement which in some cases may extend from the angle to the symphysis. Of the tumours which have no definite relation to embryological development the most common is sarcoma of the jaw. Those developing from the bone-marrow are usually benign giant-celled tumours. The malignant round-celled or spindle-celled variety occurs less frequently. Mixed tumours, fibrosarcoma, chondrosarcoma, osteochondrosarcoma, and lymphangiosarcoma are not uncommon. If a tumour develops from the bone, involvement of the nerve resulting in severe pain is not uncommon, and this is an important symptom. There is no site of predilection for sarcoma or carcinoma. Growths involving the antrum are more apt to be sarcomatous than carcinomatous.

A somewhat different type of tumour is a growth which rather commonly involves the salivary glands, particularly the parotid and submaxillary glands. This type belongs to a class known as mixed or complex tumours, new growths containing a considerable variety of tissues such as cartilage, myxomatous tissue, fat, and lymphoid structures generally considered of mesoblastic origin, and, in addition, cells resembling epithelial, endothelial, or connective-tissue cells, from which they are known as epithelial, endothelial, or sarcomatous growths. In operations upon these cases the resection should extend beyond the limits of the tumour. In other words, if the tumour has grown down to the bone it is wise to remove a section of the bone, and, in aggravated cases, the entire involved maxilla in order to go well beyond all of the tumour growth. When possible the upper table of the superior maxilla should be preserved in order to prevent prolapse of the eye.

The mortality after operations for facial tumours is much less than might be expected. Following primary ligation of the external carotid and careful administration of the anæsthetic through a tube, a satisfactory recovery follows. Operation should be performed in all cases in which there is any possibility of removing the growth.

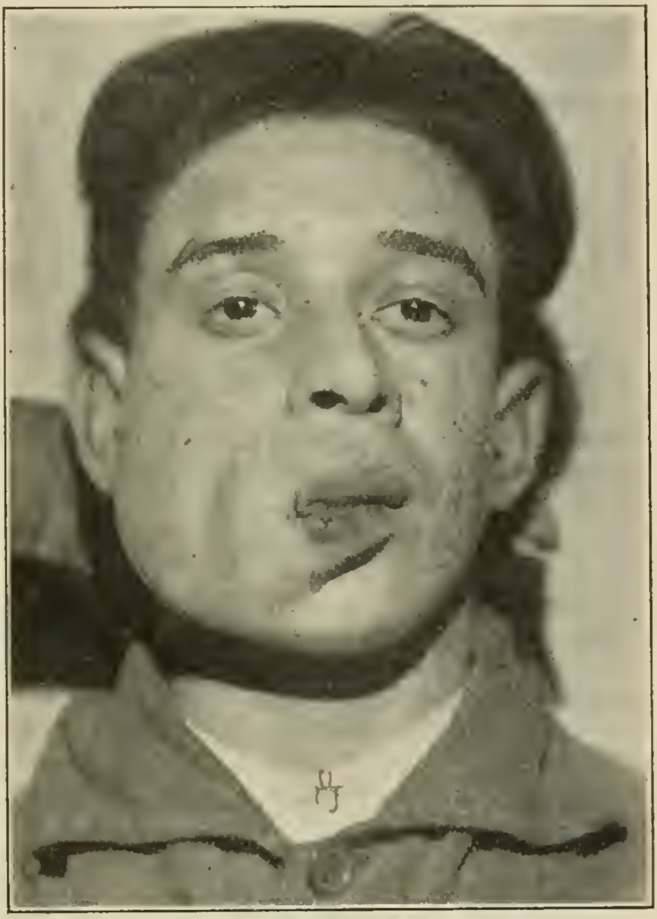

Fig. 52.—A photograph of angioma involving the right parotid region and extending thence to the cheek and lips. (*By permission of the 'British Journal of Surgery.'*)

Capillary Angiomatosis of the Parotid Gland (*Fig.* 52).—Nicory and Shattock[3] mention three cases which were microscopically examined, and the early stage at which the disease was noticed is a remarkable feature. In two cases the disease was apparently congenital. The size of the veins in both of these cases seems to indicate that with the lapse of time the primary capillary angiomatosis of the gland is succeeded by an increase in the size of the afferent and efferent vessels, a result which might be anticipated in view of the increasing demand for blood entailed by the growth of so large a capillary plexus in the glandular substance.

Parotid Fistula.—Chubb[4] describes an operation for premasseteric fistula of Stenson's duct. He points out that the restoration of the continuity of the duct, however ideal, is impossible in any but recent cases. Two horizontal incisions are made, about a quarter of an inch apart, the one above and the other below the fistula. Two short vertical incisions serve to isolate a small button of skin bearing the fistulous opening. The posterior of these incisions is cautiously deepened, a probe being meanwhile retained in the duct lest the latter should be too closely encroached upon (*Figs.* 53 and 54). The anterior vertical incision is deepened at once until it enters the mouth immediately below the reflection of the mucous membrane opposite the upper molar teeth. In one case this area of the cheek was adherent to the alveolar border owing to scarring following the injury, and was mobilized by means of an epithelial inlay some weeks prior to the operation. The probe is now withdrawn, and small catgut mattress sutures inserted in the anterior and posterior lips of the skin button, and drawn through the wound into the mouth. Similar mattress stitches are inserted in the lips of the opening of the buccal mucous membrane, and these are now tied together within the mouth. The original anterior edge of the skin button is stitched to the posterior lip of the opening in the mucous membrane, while the posterior edge of the latter is tied to the anterior lip. (*Fig.* 55, *a*, *b*, *c*, shows diagrammatically the successive stages in this process.) No attempt is made to mobilize the skin button sufficiently to allow of its complete reversion. If it is turned over to face forwards and slightly inwards, the elasticity and loose attachment of the oral mucous membrane will allow of the latter being drawn up to the button.

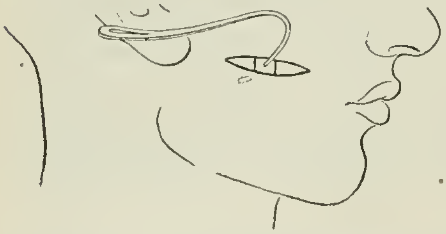

Fig. 53.—Showing the incisions. A probe has been inserted into the fistula. The triangular areas of skin on either side of the area bearing the opening are discarded.

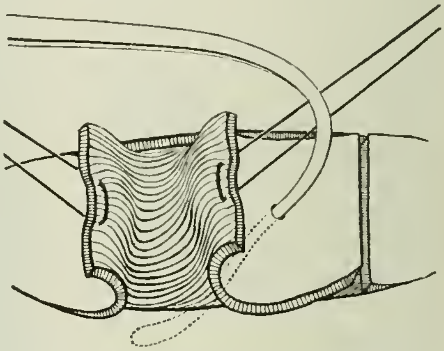

Fig. 54.—The island of skin bearing the fistulous opening in course of mobilization. Deepening the posterior incision, with probe in position in the duct.

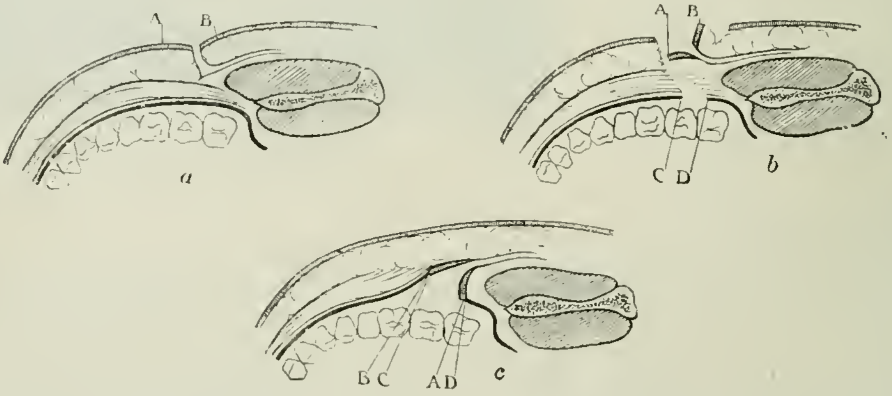

Fig. 55.—Semi-diagrammatic horizontal sections showing: *a*, The condition of duct and fistula prior to operation; A and B, position of incisions. *b*, The mobilized area of skin bearing the fistulous opening, and containing the salivary duct in its pedicle; A and B, anterior and posterior lips of mobilized skin area; C and D, lips of the opening through the mucous membrane. *c*, The mobilized skin area seen in *b* has been inverted, and its edges sewn to those of the opening in the mucous membrane. The letters A, B, C, D have the same significance as in *b*.

(*Figs.* 53, 54, 55 *reproduced by kind permission of the 'British Medical Journal.'*)

the post-operative appearance in the mouth being that of a conical recess of mucous membrane, passing backwards and outwards to the fistulous opening. The lips of the original incisions are now very slightly undercut and brought together, thus covering the reversed surface of the skin button bearing the fistulous opening.

In one case the tip of a defective probe remained in the duct, and was subsequently discharged through the operation wound. This has resulted in a slight external leakage, which, however, does not amount to a complete drop during a meal. In two others healing was by first intention, and the wounds have remained dry since the operation, now more than two years ago. In all three cases there is now a free and normal discharge of the parotid secretion into the mouth.

Leriche, quoted by Ferrarini[5], draws attention to the treatment of salivary fistulæ of Stenson's duct by cutting off the nerve-supply of the parotid gland.

Cysts of the Thyroglossal Duct.—Gillman[6] comes to the following conclusions :—

1. Lesions due to the persistence of a portion of the thyroglossal duct are not rare, and must be considered when attempting a differential diagnosis of abnormalities occurring along the course taken by the thyroid *Anlage* from the base of the tongue to the region of the thyroid isthmus.

2. Thyroglossal lesions occur in the mid-line of the tongue or neck.

3. Median cervical sinuses occur singly, are never congenital as is the case in branchial-cleft conditions, which moreover are lateral in their position, though the median lesions may appear at any time after birth.

4. Median cervical sinus is always preceded by a swelling, which ruptures, or is opened by the surgeon under mistaken diagnosis, and which never closes permanently. Mucus is discharged unless it becomes purulent through infection.

5. Cysts of this structure show certain points of election, and their contents vary somewhat according to their age and the predominance of certain elements in their walls.

6. Thyroglossal lesions are more common in women than in men, and in the first twenty years of life.

Malignant Disease.—Cary[7] lays emphasis on the *association of specific disease with cancer* of the lips, tongue, and mucous membrane of the mouth. He says that the association of leukoplakia with cancer has been reported by other observers with great variability ; but a discussion of the relations of leukoplakia, cancer, and syphilis is outside our purpose here, and mention will only be made in passing that a very small number of cases of cancer associated with or preceded by leukoplakia have shown a positive syphilitic history. To recognize the presence of leukoplakia is, of course, very important. To know that cancer exists with the leukoplakia is most important. The greatest error that can present itself in the association of syphilis with leukoplakia and cancer is the loss of valuable time in carrying out a protracted course of antisyphilitic treatment on the theory that leukoplakia is due to syphilis, when an actual malignant neoplasm is already present. The percentage of cases giving evidence of syphilis is more than three times as great in cancer of the tongue as in cancer in any of the other locations about the mouth.

Davis[8] states that *malignant growths of the upper jaw* appear to be relatively uncommon. They often arise in connection with the accessory sinuses, producing nasal symptoms, and are seen first by the laryngologists. In 39 cases, examination proved the histology of the tumours to be as follows : Squamous carcinoma, 19 ; Round-celled sarcoma, 5 ; Endothelioma or columnar carcinoma, 7 ; Papillomatous growth, 3 ; Chondrosarcoma, 2 ; Spindle-celled sarcoma, 2 ; Melanotic sarcoma, 1.

Davis advises the following operative technique : Intratracheal ether is the most satisfactory anæsthesia, and was employed without any disadvantages in all the later cases. A preliminary laryngotomy was employed in four of the first cases with plugging off of the pharynx, but the patients did not make such a rapid recovery, and appeared to feel the effects of the operation more than those who had intratracheal ether. The usual Fergusson incision was made from the frontonasal suture down the side of the nose and through the upper lip. The cheek was then reflected upwards and backwards as far as possible. The horizontal portion of the incision along the infra-orbital margin was omitted, because it did not give much more access to the operation area, and leads to the unsightly deformity produced by œdema of the lower eyelid. The nasal bone, nasal process, and facial surface of the maxilla as far as the malar were removed to expose the growth, and, if the palate was not involved, the floor of the orbit with the growth was scooped out. In the cases of carcinoma the floor of the orbit was always eroded and infiltrated. When the main mass of the growth was removed, portions of it were generally found in the ethmoid, and the ethmoid was vigorously attacked with punch forceps and spoon until the inner wall of the orbit as far back as the sphenoid and up to the base of the skull had been removed. The contents of the orbit were examined, and occasionally growth was found adherent to the capsule of Tenon. In two cases only was it necessary to remove the palate, and then the more common operation of excision of the upper jaw was carried out.

If possible, the mucoperiosteum of the palate should be saved to form a flap to close off the mouth from the nose, and if this is done patients make a more rapid recovery. In the older patients, the interference with the mouth, and the taking of food when the palate is removed, adds considerably to the severity of the operation. A recurrence in the palate has not been seen. The hæmorrhage was not dangerously excessive, and preliminary ligature of the external carotid artery was done in two cases only, and was considered unnecessary unless a dissection of the glands in the neck is carried out as the first stage of the operation. So experienced an operator as Butlin did not approve of a preliminary ligature of the carotid. All the patients experienced a rapid recovery, and not one died from the immediate or remote effects of the operation.

Lain[9] *discusses epithelioma of the lower lip.* He states that cancer of the lower lip constitutes more than 2 per cent of all deaths from cancer. He emphasizes the necessity for complete surgical extirpation of the primary growth, with careful dissection of all glands after the operation; cures have resulted in a high percentage of cases.

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MULTIPLE SCLEROSIS.

J. Ramsay Hunt, M.D.

ETIOLOGY.—W. H. Hoffman[1] reviews the etiology of this affection. Multiple sclerosis (*sclérose en plaques*) has been the object of many and intense studies since the middle of the last century, and all the details of the clinical symptoms are very well known, as well as the anatomical and histopathological features.

Hitherto very little was known as to the origin of the disease. Often it had been supposed that the causes must be sought in psychic, climatic, or poisonous influences and lesions. Repeatedly a possible connection with syphilis has been considered, which in fact can produce very similar symptoms; but the modern diagnosis of syphilis, as by the Wassermann and other tests, do not support that view. On the other hand, it has become lately more and more probable that some relation to previous acute infectious diseases often exists.

From the reports published there is almost no doubt that multiple sclerosis is a well-defined disease *per se*, and not only a mere symptom of other different non-specific affections of the nervous system. Though perhaps at this moment we cannot yet form a definite idea of the whole pathogenesis of the disease, still it seems clear from the pathological findings that we have to deal with an inflammatory process produced by spirochætes and localized to the central nervous system, especially in the surroundings of the small venous blood-vessels, which are the exclusive seat of the spirochætes. The inflammation gives origin to the proliferation of the glia cells, which is secondarily followed by degeneration of the nerve fibres. Besides the nervous parenchyma, the pia mater and the connective tissue depending on it may present some signs of residuary inflammatory processes, giving thus, perhaps, some hints as to the way by which the spirochætes may have originally entered.

There is no evidence that the disease has appeared like other acute infectious diseases in epidemics or endemics, neither are there any experiences that the disease is directly transmissible from man to man, though occasionally several members of one family can be attacked. From these facts, it might be concluded that we have to consider multiple sclerosis not so much as an original acute infectious disease, but rather as a late consecutive inflammatory state of spirochætal infection, which may have originated years before, perhaps without severe symptoms, but which has remained latent in the body till at last it became manifest with clinical symptoms in the central nervous system.

Cerebrospinal Fluid in Disseminated Sclerosis.—The cerebrospinal fluid has been investigated by D. K. Adams[2] in 41 cases. The author arrives at the following conclusions:—

The cerebrospinal fluid picture in disseminated sclerosis is as follows: a normal cell-count, a negative Wassermann reaction, a luetic or paretic reaction to colloidal gold, and in most cases (83 per cent) a normal protein content. The absence of a positive Wassermann reaction in the great majority of cases, and the absence of pleocytosis, are in accordance with the view that this disease is not of syphilitic origin.

On the supposition that the origin might be spirochætal, treatment was carried out by spirochæticidal drugs. In nearly every case under treatment modifications towards a negative result of the colloidal gold reaction were noted. As regards clinical effects of such treatment, no improvement resulted in advanced cases of the disease, but prolonged treatment produced amelioration of early cases, and in one or two instances the results were marked.

With reference to early diagnosis, emphasis is laid on the evidence of the cerebrospinal fluid picture and the absence of the abdominal reflex.

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MUMPS.

J. D. Rolleston, M.D.

SYMPTOMS.—J. K. Friedjung[1] remarks that though most German authorities have not observed more than one attack of mumps in the same individual, French writers regard *repeated attacks* as a fairly frequent occurrence. He reports a unique case of four attacks of mumps in the same child in the course of a year. The patient was a girl, 6½ years old, whose second attack was barely five months after the first, and third attack three and a half months after the second, while the fourth attack was only nineteen days after the third. The first attack occurred during an epidemic of mumps, and the other three in a non-epidemic period. In the first attack the left side first and then the right were involved; in the subsequent attacks only the left side was affected.

Vaugiraud and Defaux[2] record a case of mumps in a man, age 50, complicated by bilateral *dacryo-adenitis* which developed three days after the swelling of the parotid and submaxillary glands. The lachrymal glands, which were swollen to the size of almonds, were painful and tender on pressure. There were lachrymation, conjunctivitis, and chemosis. The dacryo-adenitis subsided at the same time as the inflammation of the parotid and submaxillary glands disappeared.

C. Wesselhoeft[3] has collected from all sources 8153 cases of mumps, of which 1468, or 18 per cent, were complicated by *orchitis*. Bilateral orchitis appears to be considerably less frequent than bilateral parotitis, as only 209, or 17 per cent, out of a total of 1208 cases of orchitis were bilateral. Wesselhoeft found that when the orchitis came on within three or four days of the onset of the parotid swelling it usually accompanied a bilateral parotitis, but when it was delayed one or two weeks the preceding parotitis was just as likely to have been unilateral as bilateral. He has collected records of 30 cases in which, during an epidemic of mumps, orchitis preceded parotitis by one to nine days, and 64 cases of orchitis without parotitis. He also alludes to the cases reported by Mitchell and Ross respectively of mumps orchitis in an undescended testicle. In 347 cases in which an examination was made from six weeks to four years after the orchitis, 190, or 54·7 per cent, developed atrophy. In two of these cases feminism, probably of a temporary nature, occurred, being manifested by enlargement of the mammary glands, absence of a beard and hair on the chest, and loss of interest in sport. In no cases did Wesselhoeft find any mention of a man becoming a eunuch as the result of mumps, a fact which is explained by the rarity of mumps orchitis before puberty.

TREATMENT.—Bonnamour and Bardin[4] adopted Salvaneschi's preventive and curative treatment of orchitis by injections of **Diphtheria Antitoxin** in 65 cases of mumps in soldiers; 20 c.c. were injected on admission to hospital. In most of the cases there was a distinct diminution in the parotid swelling two to four days after the injection of serum, and a considerable fall of temperature. Of the 65 cases, 57 had no testicular pain whatever; and of the remaining 8, 5 had commencing orchitis on admission to hospital, but the pain was rapidly relieved by the injection, and only 3 developed orchitis, which was mild in character, three to four days after admission. The writers believe that the diphtheria antitoxin acts by preventing the hyperleucocytosis which occurs in mumps during complications, and increases the number of red cells, as occurs in diphtheria during serum treatment.

As regards the treatment of orchitis, Wesselhoeft[3] regards **Incision through the Tunica Vaginalis and Multiple Incisions of the Tunica Albuginea,** which is recommended by E. F. Ballenger and O. F. Elder[5] as a safe and logical proceeding when undertaken by an experienced surgeon. He also alludes to the use of 5 c.c. **Convalescent Blood Serum** subcutaneously or intravenously employed by Gradwohl and his associates, who claim that pain and fever are promptly relieved thereby.

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NASAL ACCESSORY SINUSES.

A. J. M. Wright, M.B., F.R.C.S.

Bronchitis and Bronchiectasis Associated with Accessory Sinus Disease.—Webb and Gilbert[1] draw attention to this important but previously largely neglected association. The examination and classification of large numbers of men in France during the war showed the existence of cases of chronic bronchorrhœa resembling tuberculosis, but without tubercle bacilli in the sputum. An associated and probably causative nasal sinusitis was found to exist in many, and operative treatment of this was stated by Rist[2] and Sergent[3] to be successful in curing the bronchial condition. Webb and Gilbert, since 1918, have made *x*-ray examinations of the accessory sinuses in all cases of chest disease when the sputum proved negative to the tubercle bacillus. Of these, few were found in which chronic infection of the sinuses could not be demonstrated and confirmed by washing out. Bilateral antral empyema was the most frequent variety, but at times all the sinuses were involved. The result of surgical treatment of sinuses on the bronchial condition was not so marked as in the cases reported by Rist and Sergent. The authors explain this by the greater chronicity of their cases, and urge the importance of nasal investigation in the early stages of a chronic bronchitis.

Accessory Nasal Sinusitis of Children.—Mention was made in the previous number of the Medical Annual (1921, p. 332) of the increasing attention paid to this condition. Phelps,[4] in a study of 40 cases in children, found that half of them were due to infectious diseases. He regards it as a common condition, and the not infrequent cause of nephritis, arthritis, and other general conditions. Nasal discharge and headache are the two most frequent local symptoms, and *x* rays are an invaluable aid in diagnosis. He is in agreement with other observers in finding minor measures, such as removal of tonsils and adenoids and limited turbinectomy, sufficient to bring about a cure in a great proportion of cases.

Dean and Armstrong,[5] dealing with the same subject, agree that operative measures on the sinuses are not often indicated. Of a large number of cases they have found that 80 per cent have resolved as a result of the removal of tonsils and adenoids. When any operation on the sinuses is necessary, simple drainage and ventilation almost always suffice. In three cases, however, repeated and rather extensive operations on the sinuses were found necessary. They were all cases of acute arthritis in children. As a result of repeated operations on antra, ethmoidal cells, and sphenoidal sinuses, and of treatment lasting over many months, the joint inflammation subsided. The authors consider the hæmolytic streptococcus as the infective agent in these severe cases, and state that they require treatment in hospital extending over eight months or more.

Frontal Sinusitis.—The tendency in favour of intranasal operations whenever possible is still marked. Unger[6] describes a method of draining the frontal sinus through the natural opening. The method is only applicable to cases in which a probe can be passed into the sinus either with or without removal of the anterior end of the middle turbinal. The necessary instruments are a slender frontal sinus probe, and rubber catheters varying in size from Nos. 4 to 10 French. An ordinary urethral catheter with lateral holes and cut down to 3½ in. long is suitable. The largest possible catheter should be used. Under cocaine anæsthesia, the size and direction of the frontal-sinus opening having been ascertained with the probe, the latter is pushed through the lumen of the catheter to its end, and, encased in the catheter, is reinserted in the frontal sinus. The probe is withdrawn, leaving the catheter *in situ*, and as much of the catheter as possible pushed up into the sinus. It is then cut off so that the lower end rests on the floor of the nose. The tube is removed and replaced about every two days, the sinus being irrigated on each occasion.

McGinnis[7] claims that the frontal sinus can be drained intranasally further forward and higher up than is usual, by the following method: With the patient sitting in a chair, and under local anæsthesia, the head is placed in extreme extension, and with Grünwald's forceps a bite is made into the mound of an agger cell, if present, or into the front of the ethmoidal labyrinth above the attachment of the middle turbinal, the latter being left intact. If one or more agger cells are present, part of the inferior, superior, and posterior walls is cut away, and above these some of the front wall of the nasofrontal duct. Next, with the same forceps, the free border of the turbinate is pushed toward the septum, and an opening is made through the front wall of the bulla, thus opening all the cells. All cutting is done in an up-and-down direction parallel with the turbinal and orbital plates. If the catheter can be passed into the frontal sinus it is irrigated.

Howarth[8] believes that the pendulum has swung too far in the direction of intranasal operations. For cases in which external operation is necessary, he has found the following, which he has used for eight years, to be a great improvement on the Killian operation. The incision is made just under the supra-orbital margin, and brought down in front of the inner canthus on to the side of the nose. The sinus is opened where one is always sure to find it, just above the lachrymal groove; the whole of the orbital wall—that is, the floor of the sinus—is completely removed, orbital galleries or other recesses being thrown into one large cavity. The mucous membrane is disturbed as little as possible. The ethmoid is now dealt with, all anterior cells being removed, and the cavity joined to the frontal sinus by cutting through the frontal process of the superior maxilla and the nasal process of the frontal bone. A large drainage tube is passed from the frontal sinus into the nose, and the incision sutured without external drainage.

Maxillary Sinusitis. Much attention has recently been paid to the question of the existence of cases of latent nasal sinusitis which do not present the classical symptoms and signs of sinus suppuration, but yet in which there is some degree of inflammation or degeneration of the sinus mucosa. Emerson[9] describes a condition of polypoid degeneration of the mucosa of the maxillary sinus which he considers to be frequently overlooked. This polypoid degeneration may or may not accompany a corresponding polypoid degeneration of the ethmoidal cells, and he considers that in any operation on an old-standing case of this nature the antrum should be opened and inspected. Cases with this polypoid degeneration in the antrum are subject to periodic discharge of colourless serum simulating a condition of vasomotor rhinitis. Transillumination and skiagraphy are only occasionally of help in diagnosis. A gelatinous mass washed out on exploratory puncture of the antrum is suggestive of this condition.

Dutrow,[10] in considering the same subject, concludes that cases of latent infection of the maxillary sinus are not uncommon, and probably date from an acute attack in the past which has never entirely resolved. The mucosa is degenerated and granular, and secretes a gelatinous mucoid material. Points which help in diagnosis are the presence of thick mucoid discharge in the middle meatus and nasopharynx, with a slight degree of opacity to transillumination and x rays. He considers exploratory puncture misleading, advocates the Caldwell-Luc operation, and only uses post-operative irrigation when definitely indicated, not as a routine.

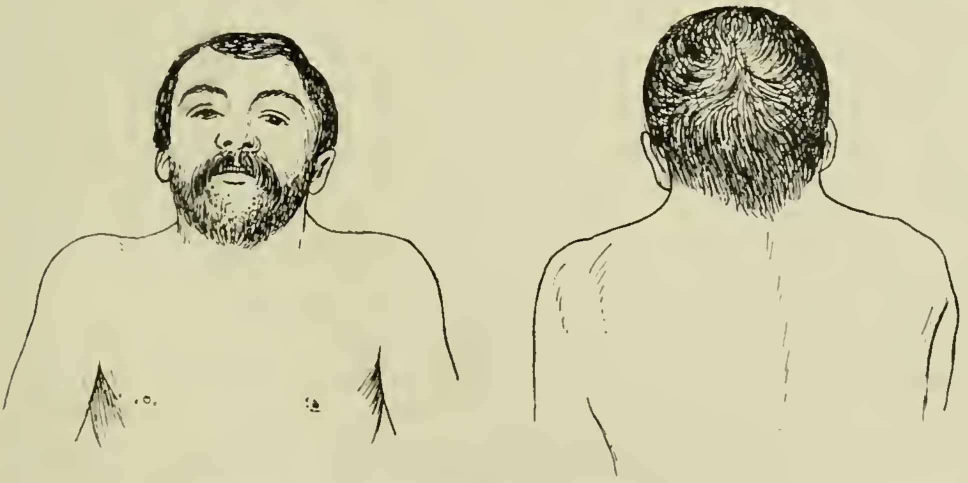
Malignant Disease.—It will be quite generally allowed that the results of operations for malignant disease of the nasal accessory sinuses have not been encouraging. Barnes[11] suggests the following as some of the reasons for the poor results usually obtained. The diagnosis is usually made too late owing to the fact that the parts are wholly hidden from view. Points that may assist in earlier diagnosis are the presence of pain or discomfort in the cheek, swelling of the cheek, and a shadow with transillumination and x ray suggesting an antral empyema. Exploratory puncture of the antrum in such a case is either negative or yields bloody serum. Epistaxis in association with polypi should always suggest malignancy. The type of operation often performed, viz., excision of the upper jaw, is unlikely to lead to success, the ethmoid being usually involved. A Moure's operation with actual removal of invaded parts, is much more suitable. Owing to the fact that the growth must necessarily be removed in fragments, implantation is probably frequent. To avoid this, immediate post-operative radiation should be employed. The author uses a tube of radium emanation of 40 mc. strength screened with steel in the middle of the gauze pack filling the post-operative cavity, replacing the tube at each dressing for a fortnight after operation. The tube of emanation is by this time inert. Three or four subsequent radiations are given at weekly intervals. The author's results in a series of 8 cases, 6 carcinomata, and 2 sarcomata, one small round-celled and the other a fibrosarcoma, were : Of the carcinomata, 2 were well and without recurrence twenty-five and seventeen months respectively after operation. The remainder recurred. Of the sarcomata, both are living and with no recurrence fourteen and twenty-six months respectively after operation.

Optic Neuritis with Nasal Sinus Disease. (*See* EYE AFFECTIONS, p. 152.)

REFERENCES.—[1]*Jour. Amer. Med. Assoc.* 1921, March, 714 ; [2]*Presse méd.* 1916, July, 305 ; [3]*Bull. Soc. méd. de Paris*. 1916, July, 28 ; [4]*Lancet*, 1920, xl, 604 ; [5]*Laryngoscope*, 1921, May, 273 ; [6]*N. Y. State Jour. of Med.* 1920, xx, 351 ; [7]*Ann. of Otol. Rhinol. and Laryngol.* 1920, xxix, 631 ; [8]*Jour. Laryngol. and Otol.* 1921, Oct., 417 ; [9]*Laryngoscope*, 1921, May, 292 ; [10]*Ibid.* 296 ; [11]*Ibid.* 1920, Oct., 647.

NECKLESS MEN (Klippel-Feil Syndrome). *Sir W. I. de C. Wheeler, F.R.C.S.I.*

The attention of clinicians has recently been drawn to two groups of anatomical variations in the bones of the vertebral columns, viz., (*a*) sacralization of the fifth lumbar vertebra, originally studied by Bertolotti of Turin, and (*b*) numerical reduction of the cervical elements, first described by Klippel and Feil, of Paris, in 1912. This latter condition is signalized clinically by the following characteristics : (1) Apparent absence of any neck, the head appearing to rest directly on the trunk, so that the hairy scalp reaches almost to the scapular level ; (2) Marked limitation of the movements of the head in all directions ; (3) Round back, scoliotic or kyphoscoliotic. The condition has been mistaken for suboccipital Pott's disease, and for torticollis, even



Figs. 56, 57.—Neckless man. Chambardel's case. (*Redrawn from 'La Presse medicale.'*)

though there is complete absence of pain. Radiography in these cases demonstrates a normal thorax, over which the cervical column is replaced by a fused long mass, in which no interarticular spaces can be observed. In the upper part of this bony mass is to be seen a triangular orifice (a spina bifida).

Klippel-Feil's original case presented marked bony abnormalities on post-mortem examination; the seven cervical and four upper thoracic vertebræ were fused into one bony mass; the origins of the first four ribs were observable at the lower part of the mass; above these the cervical transverse processes were present and carried a distinct foramen transversarium. The posterior aspect of the mass was a large V-shaped gap, a genuine spina bifida, due to non-closure of the neural arches of the first seven or eight vertebræ. Two deformed glenoid cavities above articulated with the occipital.

Dubreuil Chambardel,[1] of Tours, has collected 11 published cases from the literature, to which he adds a twelfth personal observation (*Figs.* 56, 57). Of these cases, 9 were males, 3 women. There is no evidence of heredity or of familial predisposition. Feil is of the opinion that the spina bifida is the primary cause of the deformity.

REFERENCE.—[1]*Presse méd.* 1921, May 4, 36, 353.

NERVES, PERIPHERAL, SURGERY OF. (*See also* NEUROLOGICAL SURGERY; SCIATICA.)

J. Ramsay Hunt, M.D.

Diagnosis and Treatment.—The Committee on Injuries of the Nervous System of the Medical Research Council has completed an interesting report[1] on this subject. Most cases of injury to the peripheral nervous system make a good recovery, provided treatment is carried out systematically and continued over a long period of time. An exact knowledge of what nerve or nerves are injured, as well as of the site of the lesion, is essential before treatment is begun, and at the same time an accurate record of motor, sensory, and nutritional changes present should be made.

Great stress is laid on the need for thorough collaboration between surgeon, masseur, and patient, and also on the fact that no operaton, however skilfully performed, can ensure success unless the treatment which precedes and follows it is planned carefully and carried out with intelligence.

As a preliminary to electricity tests the limb or part to be examined must be warmed, and any œdema which is present should be reduced as far as possible by massage. The nerve and muscle are first tested for faradic excitability, and, if this is present, no further electrical examination is necessary. Polar changes have little or no clinical value. The presence or absence of faradic response is the important factor, and in the great majority of cases forms a trustworthy index of the condition of the nerve.

An improvement in the galvanic response may be brought about in the absence of nerve recovery by nutritional treatment. The state of the muscle improves with massage, the application of heat, and galvanic stimulation, but this must not be regarded as evidence of definite recovery. Warnings are given as to the methods of testing sensibility, as misleading information may be obtained if care is not used. Tests with heat and cold are difficult to carry out in cases of lesions of the peripheral nerves, and contribute little of practical value.

When there is complete nerve division, vasodilation is a paralytic phenomenon; but when the interruption in conduction is incomplete and the injury is associated with severe and continuous pain, as in causalgia, dilatation of the vessels is due probably to the vasodilators. The nerves with injury of which causalgia is usually associated are the median, sciatic, and ulnar.

Sensibility is not abolished; there is little or no paralysis; but the hand or foot may become seriously deformed.

The treatment of cases of peripheral nerve injury during a period of observation and after operation follows similar lines. It may be considered under two headings: (1) Postural treatment, (2) nutritional treatment.

The principle of treatment by posture is to relax the paralyzed muscles and thus prevent their being stretched either by the force of gravity or the pull of the non-paralyzed opponents. It is scarcely necessary to say that splints must not be employed indefinitely. When no further recovery can be expected they should be discarded.

The treatment necessary to maintain and improve the nutrition in the paralyzed part comprises heat, massage, electrical stimulation, exercises, and re-education. Massage should be carried out once daily for from fifteen to twenty minutes, and must be sufficiently vigorous to cause pain. It is the best physical method of reducing œdema. Electricity is of value only as a stimulus to provoke contractions in the paralyzed muscles. The weakest effective current, galvanic or faradic, should be employed. Re-education is perhaps the most important part of the treatment. It is essential to interest the patient in his recovery, and as regeneration advances to teach him to reproduce voluntarily those movements that were produced by electrical stimulation. Specialized re-education becomes particularly necessary when we are dealing with the intrinsic muscles of the hand.

With few exceptions operations upon injured nerves must necessarily be of an exploratory nature. The site of the lesion and the presence or absence of conductivity in the nerve may be determined by clinical observations. In many cases the condition revealed when the nerve is exposed can be foretold with some accuracy; but it is only by inspecting, handling, and stimulating the nerve directly that its state can be ascertained with precision.

Operation is generally indicated under the following circumstances: (1) Total loss of conductivity, sensory and motor, in the area exclusively supplied by a nerve, which persists after an interval of two months during which proper treatment has been carried out. This interval is an arbitrary period; it allows time for the first appearance of signs of recovery provided the lesion does not require a lengthy process of regeneration. (2) Palpable neuromata at the site of the injury of a nerve whose function is seriously disturbed. (3) When recovery has begun, but has not progressed according to the usual rate, or has ceased. Still more, when function has relapsed. (4) Persistent, severe, intractable pain.

The contra-indications are: (1) The presence of an unhealed wound. This should be regarded as an absolute bar to successful operation upon an injured nerve. When the wound has been healed for a few weeks only, especially if bone was damaged at the time of the injury, the operation should be delayed on account of the danger of recrudescent sepsis. (2) Progressive recovery. (3) An injury so placed as to render an operation unusually difficult or the likelihood of successful suture very doubtful.

There has been considerable discussion as to whether the whole or only a part of the proximal bulb should be resected. It is probably of more importance to have the sectional area of the two surfaces which are to be sutured together as nearly as possible of the same size, and individual nerve bundles distinctly visible.

The various special manœuvres for bringing together widely separated ends which may be adopted are: (1) Loosening of the nerve in its bed for some distance, both above and below, by passing a blunt dissector along it. (2) Relaxation of the nerve by flexing or extending the joints over which it passes. (3) Displacement of the nerve so as to make it pursue a more direct course.

Whatever material is used for suturing, it should be as fine as is consistent with efficiency, and a material which excites the minimum amount of fibroblastic reaction around it. Fine linen thread and silk make satisfactory suture materials. Catgut as ordinarily prepared causes much more cellular reaction than either linen thread or silk, and it is doubtful whether this disadvantage is overbalanced by its greater absorbability. The passing of a central retention stitch through the thickness of the nerve is undesirable and rarely necessary. A proper approximation can be secured by suturing the edges of the sheath only. A continuous suture should never be used. The two surfaces should not be brought tightly together; regeneration takes place more easily when they are separated by a minute space.

After suture the nerve should be left lying in contact with normal cellular tissue if possible. No advantage has been shown to attend the wrappings of the nerve in artificial membranes, fat, or fascia, and subsequent explorations have not infrequently shown that in some cases these materials exert a harmful influence. The wound must be rendered as dry as possible before it is closed. The importance of careful hæmostasis can scarcely be overrated.

The care with which the paralyzed parts are attended to during the period of waiting, before and after the operation, has a profound influence on the time necessary for the return of function after suture, as well as on the completeness of the ultimate recovery. The results will inevitably be disastrous, however perfect the regeneration of the nerve may be, if the affected muscles are allowed to become wasted and stretched, and the skin to remain poorly nourished because of neglect of appropriate nutritional and postural treatment.

End-results of Injuries to the Peripheral Nerves treated by Operation.—In this connection an interesting discussion was held at the last meeting of the British Medical Association. Sir William Thorburn gives a summary of recent work upon the subject. It is now agreed that the regeneration of a peripheral nerve is in all cases accomplished by the down-growth of axones from the proximal end into channels or sheaths awaiting them at the peripheral end. The proximal axone is connected with a sensory or motor neurone, while the peripheral sheath leads to or is connected with a terminal organ, either motor or sensory. It must therefore be recognized that, apart altogether from anatomical continuity, repair which may lead to a good functional result requires that a sufficient number of axones shall enter into a sufficient number of peripheral sheaths which are capable of leading them in the right direction. Thus, for example, motor axones entering channels connected with sensory terminals are probably lost for ever, and so with afferent axones which become connected with muscle-endings. So far as is known, the union of a purely motor with purely sensory nerve is not followed by any physiological connection whatever. It is also important that as far as possible the down-growing axones should enter the identical channels for which they were originally intended. Thus, if the spinal motor cells for, let us say, the extensor longus pollicis become connected with the peripheral channels for the brachialis anticus which lie in the same nerve, physiological confusion will result, and the spinal cord will not be able to produce the movements which the brain demands. No doubt errors of this type can be to some extent corrected by means of education, but such re-education will be necessary in the great majority of cases of nerve suture.

Before proceeding to the analysis, there is one other consideration of importance in judging of an end-result. A result which is neurologically good may be economically poor, in the sense that the patient is unable to use the affected part as he ought to do. Such defect may be due to psychical conditions, to the secondary changes of muscular atrophy or of arthritis, or possibly to a form of ataxia in which, while all muscles are capable of action, they can be properly used only while their action is under visual control. This local ataxia, which may render economically imperfect an otherwise excellent limb, is probably due to want of restoration of the deep afferent fibres by which perfect muscular action is judged and controlled.

Thorburn then analyzes the late results of such operations. Of 108 personal cases of suture or grafting analyzed by Tinel, 14 were complete failures, 22 (or say 20 per cent), showed practically complete recovery, and the remainder were regarded as improved. Daw says that 40 per cent of his cases showed signs of returning motor power after seven months. Sherren found that of 21 cases of secondary suture, some return of motor power took place in all, but that it was never complete. Kennedy, examining after a long period cases occurring in civil life, claims that 73 per cent of all sutures were completely successful. Dumas investigated 115 personal cases of operation for war wounds of one nerve only, the musculospiral. He claims evidences of recovery in 42 per cent of his cases, and of some regeneration in 65·2 per cent, the remaining 35 per cent being presumably entire failures. But it must not be forgotten that for several reasons this yields better results than any other nerve. In 36 cases of secondary suture Joyce found 8 recoveries, 6 with considerable improvement, 8 with some improvement, and no result in 14. Souttar and Twining found that, of 61 cases of suture, 7 recovered, 32 were recovering at the time of report, 7 were doubtful, 2 were failures, and 13 were not traced: but their results, like those of Joyce, would probably be improved by a later report, as in many cases the time elapsed had not been sufficiently long. Adson reports the results of operations on 41 cases, four-fifths of which were end-to-end suture and the remainder plastic operations. Of 30 cases traced, "the average amount of improvement obtained was 58 per cent return of the sensory, 62 per cent return of the motor, and 67 per cent return of the trophic function"; 73·1 per cent showed improvement.

These figures, which are by no means easy to compare, leave the impression that secondary nerve suture gives very good results in somewhere between one-third and two-thirds of all cases; but the most careful study of original articles, as well as Thorburn's own personal experience, leads him to believe that a perfect neurological recovery is rarely if ever obtained.

Certain special features are worthy of mention. Nerves which supply large muscles, and especially muscles of homogeneous type, such as the musculospiral, give much better results than those whose muscular distribution is small and complicated, such as the median and ulnar. Nerves also which are mainly motor or mainly sensory are more amenable to treatment than those whose function is more complicated. In both of these cases, no doubt the ill effects of bad shunting bear more heavily upon the more complicated trunks. Dual lesions are more serious than single ones, so that a combined injury of the median and ulnar nerves is susceptible of very little improvement indeed.

The time required for recovery is very great. On the basis of what is known as Tinel's sign, the down-growth of axones occurs at the rate of about 1 mm. a day, which would require, say, 200 days for a fibre to grow from the wrist to the tip of the index finger, or 2 years from the middle of the thigh to the foot.

Percy Sargent, in continuing the discussion, stated that nerves implicated in war wounds rarely present the comparatively simple problems of recovery raised by the experimental division of a nerve, or even by the common 'cut wrist' accident where a nerve is cleanly divided by a fragment of glass. In war wounds nerves are bruised and lacerated, the damage caused by a missile of high velocity is not limited to the immediate neighbourhood of the injury, and surrounding structures are often extensively damaged; a main artery may be obliterated. Septic infection, often severe and prolonged, delays operative repair of the nerve, prejudices its chances of regeneration, and often prevents the early application of those forms of mechanical and physical treatment which are essential. In considering the results of operative treatment for divided nerves, he thinks that attention should be paid to the cases of direct end-to-end suture, for this is the only means whereby conductivity can be restored. Nerve grafting, or the bridging of a gap between the ends of a divided nerve, has no practical value. It has excited much interest, and has been the subject of a great deal of experimental work. So far as he is aware, no useful result has ever been secured by this means in the human subject.

In so far as the nerve injuries of the late war are concerned, he thinks we are not yet justified in using the term 'end-results', at least on any extensive scale. It is true that the restoration of function in a good many instances after suture of the musculospiral and external popliteal nerves has already been so complete that in those cases it may be regarded as an end-result; but in the majority it cannot definitely be said that a stationary condition has been arrived at, even three or four years after the operation.

The results of suture are well known to differ widely in different nerves. A nerve like the musculospiral, which subserves simple and elementary functions, is often restored so perfectly that only the closest examination can detect any departure from the normal in the parts supplied. With nerves like the median and ulnar the case is very different. These nerves subserve delicate and complex movements, the execution of which requires not only the proper motor impulses but also the integrity of a complicated sensory mechanism. One has only to contrast the size of the nerves of different muscles in order to realize how much more is required of regeneration in the case of the more complex nerves. For example, in relation to the bulk of muscle supplied, the nerves to the glutei are ludicrously small when compared with the deep branch of the ulnar. We speak of these nerves as motor without always realizing how many of their fibres are afferent and carry those sensory impulses which must necessarily reach the brain before the muscles can be thrown into orderly and co-ordinated action. In order that useful function may be regained, it is necessary that sensibility, as well as muscular power, should be restored. This is specially true of the median nerve, and, unfortunately, the recovery of sensibility in the area exclusively supplied by this nerve is extremely slow, and rarely satisfactory. From the sensory standpoint the median is more important than the ulnar, whilst, as far as the hand is concerned, the ulnar is the more important motor nerve.

Late functional results after nerve suture may be unsatisfactory from causes other than faulty regeneration. A patient with good muscles and supple joints, and with good recovery both of sensibility and of electrical reactions, may be quite incapable of making use of his limb. Sargent remarked that the importance of the psychological aspect of such cases was now too well recognized to need more than a passing notice, and he only mentioned it in order to point out another disturbing factor in the estimation of results. The value of re-education can scarcely be over-estimated.

Another group of cases requiring operative treatment concerns those morbid conditions of an injured nerve which are evidenced by nutritional and vasomotor changes in its area of distribution, and by causalgia. There can be little doubt that the great majority of what are sometimes loosely termed 'trophic' changes are in reality the direct outcome either of neglect or of immobilization, whether imposed by splinting or by paralysis. Most of such changes can be prevented by the early application of appropriate measures, and many can be cured or at least relieved by properly directed physiotherapeutic treatment. They are apt to be encountered in any case of complete interruption of conductivity of a nerve. We must remember, too, that nutritional disturbances result from damage to the main artery of a limb. Disordered vasomotor activity, however, is on a different footing. It is associated with partial and irritative lesions, and is of course seen at its worst in the area of distribution of those nerves which are particularly rich in vasomotor fibres—namely, the median, ulnar, and internal popliteal. The existence of disordered vasomotor activity naturally affects the end-result, especially if it has been present for any considerable period before operative treatment is undertaken, since profound nutritional changes will already have occurred not only in the joints but in all the other affected structures as well.

The treatment of causalgia by operation is rather to be encouraged than otherwise. When successful it not only relieves suffering, but allows of the institution of physiotherepeutic measures which, by reason of the pain, have necessarily had to be omitted. Further, the 'trophic' changes so often associated with causalgia may be arrested. These factors have a very great influence upon the ultimate recovery of function in the limb. The injection of alcohol into the nerve well above the site of injury often affords immediate relief, but at the same time there is considerable danger of producing a lesion which may never be completely recovered from. The weaker the alcohol employed, the less will be the chance of producing so undesirable a result, but at the same time the pain cannot be certainly relieved by the more dilute solutions. The best results are obtained when the strength of the alcohol is so adjusted as to relieve the pain sufficiently to let movement and massage be employed without seriously affecting either the motor or sensory functions.

Forrester-Brown[2] gives the results of operations for nerve injury at the Edinburgh War Hospital. She states that the results of a nerve operation can be measured in two ways: (1) Anatomically; (2) In terms of function, that is, working capacity. Out of 643 cases of nerve injury operated on in the Edinburgh War Hospital, 552 were able to be traced, and 396 were personally examined. The written reports from the 156 not examined were included only in the study of their capacity for work. Out of 237 cases of nerve suture, 12 per cent are at ordinary work, 35 per cent at light work. The cases with upper-limb injury show a slightly higher percentage at work than those with lower-limb injury. Even cases of musculospiral suture give the same percentage at ordinary work, but rise to 54 per cent at light work. A series of 95 cases of injury to the right upper limb show only 8 per cent at ordinary work, but this factor does not affect the percentage at light work. An analysis of the figures for the individual nerves shows 15 per cent of ulnar sutures at heavy work—that is, above the average; whereas 56 per cent medians are at light work, and in this above the average. This is interesting, as it confirms one's impression that, in regard to skilled capacity, anæsthesia of the thumb and index is more disabling than the general weakness produced by the loss of the ulnar intrinsic muscles. The contrary appears to be the case where rough use of the limb is required.

Out of 187 neurolysis cases, 8 per cent are at ordinary work, 36 per cent at light work. Thus they are slightly less satisfactory than the suture cases, which is the contrary of what might have been expected,

Out of 81 tendon transplants for various lesions of the upper limb, 23 per cent are at ordinary work, 36 per cent at light work. This is markedly better than the figures for nerve suture.

Degree of Recovery after Nerve Suture.—Out of 158 suture cases, 28 per cent showed complete motor return, 19 per cent complete sensory, 21 per cent complete trophic—50 per cent incomplete of all three functions. Total complete recovery (as defined above) was found in 5 median and 8 musculospiral cases; almost complete recovery in several ulnar cases; absence of any recovery was found in 1 median and 6 transposed ulnars. These latter developed neuromata and were sutured again, after which some began to recover. The others could not be traced.

As regards individual nerves, the median (35 cases) showed 50 per cent complete motor and 28 per cent complete sensory recovery. The ulnar (53 cases) showed 17 per cent complete motor and 13 per cent complete sensory recovery, and 66 per cent incomplete of both. The musculospiral (21 cases) showed 62 per cent complete motor and 33 per cent complete sensory recovery. Thus the apparently favourable nature of lesions of this nerve is due rather to the insignificance of its sensory distribution and to its relatively simple motor functions than to any speciality of the process of regeneration in it.

As regards nerve-graft and flap operations, out of 14 cases, 1 showed complete motor return, 2 incomplete motor return; 4 showed sensory improvement. Three nerve grafts were subsequently explored, and the grafts were found recognizable as nerve tissue; but they were embedded in dense scar, they remained of smaller calibre than the nerve into which they had been grafted, and they failed to respond to direct faradic stimulation.

Recovery of Neurolysis Cases.—Out of 117, 43 per cent had full motor function and 19 per cent full sensory. All except ½ per cent showed improvement, and no case was made any worse by the operation. This suggests that exploration is advisable in all cases of peripheral nerve injury when steady improvement does not occur spontaneously within one to two months of the healing of the wound.

Results of Tendon Transplants.—Of 96 transplants (both upper and lower limbs), all except one gave useful restoration of the lost function, while many were excellent.

Tinel's sign of tingling referred to the distribution of the nerve, and elicited by tapping it at a point corresponding to the level reached by the down-growing axones, was usually the earliest sign of recovery, and was obtained about three to four weeks after operation at a point slightly below the suture level, from which it descended more or less regularly in correspondence with the return of function at the various levels. It is noteworthy that this sign has been absent in a few cases which recovered, and that it has been present in some which have so far shown no other evidence of recovery. The next sign to appear was usually tenderness to pressure of the muscles supplied immediately below the lesion.

Late Results of Operation.—Joyce gives his experience as follows: In a personal series of 161 operations on nerves, there were 22 cases which at the time he considered to be irreparable by end-to-end union. These were dealt with as follows: 6 musculospiral injuries by alternative tendon transplantations; 6 ulnar-nerve injuries were repaired by double lateral implantation into the median; 8 cases were dealt with by free autogenous transplants—1 great sciatic, 1 posterior tibial, 3 ulnar, 3 median; 2 cases were dealt with by homologous transplants—1 musculospiral, 1 ulnar.

Tendon transplantation for irreparable injuries of the musculospiral nerve gave results which left nothing to be desired, and he considers it the operation of choice.

In the 6 cases of *double lateral implantation* :—

Average time between date of wound and healing of wound	99	days
Average time between date of wound and operation ..	313	,,

In the 8 cases of *autogenous transplantations* :—

Average time between date of wound and healing of wound	188	days
The longest time being	539	,,
Average time between date of wound and operation ..	426	,,
The longest time being	1088	,,

The results of *free autogenous transplantations* have been less favourable :—

One ulnar case in the upper arm showed voluntary power and faradic response in the flexor carpi ulnaris nine months after operation, but no sign of recovery in the ulnar intrinsics.

One in the forearm showed faradic response in the adductor pollicis and first and second palmar interossei eighteen months after operation, without voluntary action.

Another in the forearm showed no sign of recovery fifty-four months after operation.

The sciatic, in the middle of the thigh, showed recovery of good voluntary action and faradic response in the calf muscles of the leg thirty months after operation, with incomplete recovery of sensation and no recovery in the anterior tibial or peroneal muscles.

The three median cases showed no signs of recovery at the end of five, eight, and nine months respectively.

References.—[1]*Surg. Gynecol. and Obst.* 1921, April, 301 ; [2]*Brit. Med. Jour.* 1920, ii, 462.

NEUROLOGICAL SURGERY, THE SPECIAL FIELD OF. (*See also* Cerebral Tumours ; Electrotherapeutics ; Hydrocephalus ; Nerves, Peripheral ; Pituitary Surgery ; Sciatica ; Spine.) *J. Ramsay Hunt, M.D.*

In an interesting address on this subject, Harvey Cushing[1] says that those engaged in scientific or professional pursuits have need of a periodical accounting of stock no less than those engaged in business. The results of such an inventory may sometimes be of more than personal interest, especially when projects have been undertaken which are in a measure novel or special, for their success or failure may encourage others or may deter them from similar adventures.

BRAIN.

Cushing regards the subtemporal and the suboccipital operation as being the two most useful procedures in craniocerebral surgery, though, as is true of all operations, they are by no means perfected, and there are right and wrong ways of performing them.

The subtemporal decompression is placed first on the list. It may be employed as a temporizing measure even in the presence of a localizable lesion, but it is of chief value in all unlocalizable cerebral tumours. Naturally, since the bone defect is purposely made over the relatively silent temporal lobe, the growth may at times be unexpectedly disclosed. In the presence, moreover, of a questionable cerebellar lesion, the existing symptoms being hardly such as to justify the more elaborate and difficult posterior exposure, the measure may be used as an aid to diagnosis ; for the existence of an obstructive hydrocephalus can be determined under these circumstances by a puncture of the temporal horn of the lateral ventricle, a matter of considerable localizing value, though it is to be admitted that in the presence of a hydrocephalus a decompression over the cerebrum gives but slight pressure relief.

The routine operation, which may be regarded as of second importance, is the combined osteoplastic exploration and decompression. With the bone-flap so placed that its base is in the temporal region, the squamous wing of the temporal bone may be rongeured away after the flap is reflected. Though surgeons in the past have sacrificed without hesitation large portions of the calvarium in eradicating tumours, and occasionally this may be necessary even now, yet it is highly desirable that the cranial chamber should be kept as intact as one's skill and the conditions permit. It is also desirable for many reasons that an operation for tumour should be conducted whenever possible in a single session, and the old two-stage performances, provided there is careful blood-stilling, are less and less frequently called for.

The third procedure, the typical cerebellar exposure, is a still more difficult operation, and necessitates elaborate preparations and skilful team work if a long series of these measures is to be carried through with a minimal mortality. In this performance the steps are practically the same, whether it resolves itself into a decompression or into the more or less complete removal of a tumour, should one be disclosed. It is a long two-hour operation at best —an hour for the full exposure and another for wound closure ; but when tension is great, when there is threatened respiratory difficulty so that a ventricular puncture in the course of the early stage is called for, or when there is a recess tumour which requires long and careful manipulations, or a tumour of the mid-line which necessitates removal of the arch of the atlas and prolongation of the dural incision down over the spinal canal as far as the axis, the performance may well require an extra hour or two.

Since the war, influenced by De Martel's experiences as well as by his own, Cushing has made a few cerebellar exposures under a local anæsthetic ; though this is possible, he does not feel that as perfect an operation can be carried out in this way as when the patient is etherized, even though this in itself adds an element of danger.

He emphasizes again that there is no field of surgery in which fastidiousness is more essential to success. Imperfections in technique in the course of operations on other parts of the body, where other tissues than those of the central nervous system are concerned, may delay recovery, but do not necessarily impair an end-result. But corresponding slips which compromise the function of the nervous system may sometimes leave mental or other disturbances which are irrecoverable and to which death is preferable.

The surgeon who feels a sense of responsibility regarding these difficult cases, and who would reduce post-operative deformities and accidents to the minimum, must often put all the reserve he has into a single operation. Without injustice to the patients more than one stereotyped measure like a trigeminal root avulsion or subtemporal decompression may be undertaken in a single morning, but in the case of the more arduous and uncertain procedures the physical strain and responsibility may be such that he would be foolhardy and negligent of his patients' welfare who would venture on a succession of these tasks.

Tumour Classification.—Cushing classifies cases as : (1) Tumours certified (or verified) only when the diagnosis has been confirmed and the type of tumour identified by histologic examinations of tissue secured either at operation or necropsy ; (2) Tumours uncertified when, though not histologically confirmed, the diagnosis is well nigh unquestionable ; (3) Tumour suspects, when it is a likely diagnosis. In this last group is kept a careful list also of a variety of conditions loosely designated as pseudo-tumour (though not in the meaning of Nonne), comprising states, whether so proved or not, other than tumour, but which have been sent to the clinic in view of a supposed tumour syndrome.

The tentative diagnosis of some of these conditions, as other than tumour, may come to be verified subsequently at operation or necropsy; but mistakes in these borderline lesions are common, and cases long classified as pseudotumour sometimes prove in the end actually to have been tumour cases, just as the case of an occasional patient with the diagnosis of 'tumour uncertified' proves in the end to be other than a tumour case.

The following greatly compressed table will show something of the numbers and give a general idea of the situation of the tumours in his complete series.

TABLE SHOWING SITES OF CEREBRAL TUMOURS.

SERIES	FOREBRAIN			PITUITARY, INCLUDING SUPRASELLAR		HINDBRAIN			TOTALS
	Certified	Uncertified	Suspect	Certified	Uncertified	Certified	Uncertified	Suspect	
Baltimore ..	101	51	23	41	20	53	34	14	337
Boston ..	146	110	62	132	52	131	72	30	735
Totals ..	247	161	85	173	72	184	106	44	1072

To give some general idea of the more strictly operative features of the work the following figures of a consecutive twelve months of service ending Sept. 1, 1920, have been assembled. Of 182 patients admitted with a diagnosis of presumptive or possible tumour during this period, records show that 54 were not operated on. The remaining 128 patients were operated on in 160 sessions, with 16 fatalities, giving an operative mortality of 10 per cent, a case mortality of 12·5 per cent and a mortality of 15·5 per cent for the 77 patients for whom a tumour extirpation, partial or complete, was attempted.

Pituitary Disorders.—In general terms, it is Cushing's present opinion that when there is a primary pituitary adenoma with enlargement of the sella and signs of implication of the chiasm, the operation of choice is a trans-sphenoidal one. Properly conducted, it is an operation of comparatively low mortality, convalescence is a matter of a few days, and the results are often brilliant, with restoration of vision—the main object of the operation—which may be astonishingly rapid. However, it is not an operation which is likely to be repeated with equal success (true of any operation) in case the adenoma continues to grow rapidly or has already broken down the dural barriers and invaded the cranial cavity. Under these circumstances, if an operation is to be done at all, it must be from above if there is to be any prospect of preserving or restoring vision, and this—an improvement in vision, not mere operative recovery—is our present criterion of a successful procedure.

It is very doubtful, however, at an early stage of a primary intrasellar adenoma, when the conditions are favourable for an operation through the nose, whether patients should be urged, or would be willing, to submit to an operation from above, with its admitted high mortality and likelihood of complications. For it is accompanied by a wide exposure of the brain, whose cortex may suffer injury, as may indeed the chiasm itself, and the operation furthermore opens the dural barriers, so that further enlargement of the growth finds ready access to the region we would wish to protect.

Studies on the Cerebrospinal Fluid Circulation.—Intracranial overtension is largely a matter of an increase in the fluid content of the chamber, whether it exists as free fluid in the ventricular and arachnoid spaces, or as an œdema, a state to which the nervous tissues are particularly prone. Though formerly the extensive withdrawal of fluid was looked on with apprehension, it has come to be an essential step in many craniocerebral operations, during the course of which the fluid, either from ventricles or arachnoid spaces, is not only thoroughly evacuated, but may be permitted to drain away during the course of a long operation.

Weed, by adapting the principle of injection of non-granular fluids from which granules might subsequently be precipitated, showed conclusively that the arachnoid villi represent the points of escape for fluid which, by a process of seepage, enters directly into the pachymeningeal sinuses. It was Wegeforth's proposal that in cases of hydrocephalus a series of punctures be made directly through the sinuses into the subarachnoid spaces, under the assumption that the puncture holes would become occluded by arachnoid, making thereby new and artificial villi through which fluid might escape. If it is true that most cases of congenital hydrocephalus can be accounted for by a faulty development of the villi, the rational treatment is to reproduce in some way this channel of outflow either by direct drainage into one of the larger sinuses or by encouraging the formation of new villi in the manner Wegeforth suggested, rather than by an attempt to check the formation of fluid. At least, it is along these lines that surgical efforts have tended of late years. Certainly no form of drainage into tissue spaces is effective, for by a curious property of the extracranial tissues, when they are made œdematous by cerebrospinal fluid leaking into them, a smooth endothelial-lined sac ultimately forms which is impervious to the further escape of fluid.

In a recent paper on hydrocephalus resulting from strictures of the aqueduct of Sylvius, Dandy estimates that 66 per cent of all cases of congenital hydrocephalus are due to Sylvian obstruction. If this is true, the agency of obstruction to which we have devoted attention is less common than we had supposed.

In another recent paper which has aroused great interest, Dandy has put forth some very definite claims regarding the localizing value, in cases of brain tumour, of what he calls *ventriculography.* This is, in other words, the taking of *x*-ray plates of the cerebral ventricles after their fluid contents have been removed and replaced by air. It is certain that in some rare conditions a more exact localizing diagnosis might be made in this way than in any other, and, in the case of tumours situated in silent areas above the tentorium which have led to dilatation as well as deformation of one of the ventricles, perhaps only in this way. That the procedure may be sufficiently developed and safeguarded so that it can be routinely utilized for this purpose is quite within the realms of possibility. The procedure is in an experimental stage, and surgeons may safely leave it in Dandy's hands to work out more thoroughly its possibilities as well as its hazards. That there have already been a goodly number of fatalities, doubtless in the hands of people less expert than the author of the method, is well known. It will soon have a bad repute if so much is expected of it as is given in the author's conclusions, and if the surgeon is encouraged to believe that henceforth he will have less need of exercising his neurologic knowledge in localizing brain tumours.

Another procedure likewise in an experimental stage, though capable, it is hoped, of further development, is the *diagnostic puncture of the cisterna magna,* a procedure worked out in the Army Neurological Laboratory under Weed's direction during the war, and which has subsequently been warmly advocated by James B. Ayer. When one realizes how loth the profession was to adopt Quincke's lumbar puncture as a more or less routine measure, one hesitates to say that a suboccipital structure will not some day come to be as commonly employed. However, even a lumbar puncture is not without risk, as those are well aware who have seen patients with unrecognized cerebellar tumours die from respiratory paralysis soon after one has been made; and the risks of a puncture of the posterior cistern under similar circumstances would be infinitely greater. Hence this procedure, like the foregoing, had best be left in the hands of its sponsors until they can give us complete details not only of the method but of its diagnostic and therapeutic possibilities, and above all of its hazards.

One of the most suggestive of recent papers is by Weed and McKibben on the *experimental alteration of brain volume following the intravenous injection of various substances in solution.* They observed that, after the cortex was exposed by a trephine opening, the intravenous injection of a watery solution caused the brain to protrude through the opening, and contrariwise, that a hypertonic salt solution caused it to recede, sometimes to a very extraordinary degree. That these observations had great possibilities of clinical application was immediately apparent to all. They found, in the first place, that it would answer almost as well to give sodium chloride by mouth, and it is at times amazing to see what an immediate symptomatic effect this simple procedure may have, particularly when there is increased intracranial tension.

SPINAL CORD.

Infections.—Great hopes were aroused, particularly from a prophylactic standpoint, by Crowe's discovery of the passage of **Hexamethylenamine** through the choroid plexuses, and its prompt appearance, after administration by mouth, in the cerebrospinal fluid. They did not know at the time that it appeared unchanged, and that only in an acid medium like the urine was it broken up with the liberation of formaldehyde. Crowe's observations, however, on the efficacy of the drug, particularly as a prophylactic, in experimental canine meningitis, were so convincing that we have continued with its use in certain conditions—in patients with basal fracture, before trans-sphenoidal pituitary operations, and so on. It certainly does no harm, though we may have been leaning on a broken reed. In view of the fact that most of these pathogenic cocci are acid producers, it is possible that in process of their multiplication enough acid may be given off by them to liberate a certain amount of formaldehyde in their immediate vicinity, without producing an appreciable change in the reaction of the fluid as a whole—in short, that in this way, even though the cerebrospinal fluid retains its faintly alkaline reaction, the growth of organisms may nevertheless be locally inhibited.

Tumours.—No sufferers so greatly tax one's sympathies as the victims of malignant spinal metastases, and in 1910 Cushing even suggested "the deliberate trans-section either of the entire cord or of the posterior columns alone, cephalad to the lesion." Akin to this, though less radical and advocated for less critical conditions, are other palliative measures which have been put in practice. Förster's posterior-root division in cases of tabes, which is but a development of the old operation advocated for intractable neuralgias of amputation stumps, is one example: another is the procedure which Frazier and Spiller have described, of dividing the anterolateral columns alone, a procedure based on the accurate localization of the pathway for pain.

Trauma.—These may be divided into: (1) The hematomyelias; (2) The total cross-lesions, usually from fracture dislocation; and (3) The partial injuries, these being the only ones suitable for surgical intervention. The difficulty lies in distinguishing the three groups, and one must acknowledge that there is no sharp dividing line between them.

PERIPHERAL NERVES.

From the tremendous mass of material of the past few years the curious observation was soon made that certain nerves manifest a much greater tendency to perfect functional reunion than others. To take a single example, the prognosis after injury and suture of the musculospiral was far better than after a corresponding injury of the median. This appeared, moreover, to have no relation to the distance between the seat of injury and the periphery, for a high radial suture was more favourable than a low median. The explanation for this which seems best to meet the facts is that the functional recoverability bears relation to the degree of purity, whether sensory or motor, of the nerve in question. Thus the musculospiral nerve has a great preponderance of motor fibres, and consequently after suture there is less chance of motor axones finding their way down sensory pathways and the reverse, than if the number of sensory and motor fibres were more nearly equal, as is true of the median. It is assumed that, when an imperfect functional result follows what seems to be a simple and perfect nerve suture, as so often happens after median nerve sutures, the majority of motor fibres have grown down into sensory sheaths to sensory end-organs whose messages they are incapable of transmitting, and the majority of sensory fibres likewise to motor end-organs. This interpretation may be quite wrong, though it seems to fit the facts, and, if correct, it would appear to favour such detailed operative procedures as Elsberg has described, based on Dejerine's studies of the cross-sectional topography of bundles in the peripheral nerves. However, even if it is surgically possible to approximate a divided peripheral nerve, bundle for bundle, in the process of a nerve suture, which the writer doubts, there is something other than end-to-end proximity—and it is only a matter of millimetres—which attracts the wandering axone into some particular peripheral tube. Indeed one may see a perfect functional result when an actual (though small) gap has been left; or, contrariwise, an imperfect result with the most painstaking approximation.

Reference.—[1]*Arch. of Neurol. and Psychiat.* 1920, Dec.

NEUROSES. (*See* Psychological Medicine.)

NITROBENZOL POISONING. (*See* Poisoning.)

NON-SPECIFIC PROTEIN THERAPY. *Herbert French, M.D., F.R.C.P.*

The trend of modern therapeutic thought has been strongly in the direction of seeking specific substances for the relief or cure of specific maladies, and a great impetus was afforded in this direction by the researches of Professor Almroth Wright; a great part of modern vaccine treatment owes its birth mainly to his work, and so fascinating has been the theory that for every microbic infection it should be possible to devise, manufacture, or obtain a specific 'something' which may help the patient to counteract the effects of any particular organism when it attacks him, that there has been for a time a tendency to regard most kinds of vaccine treatment in particular, but also certain types of serum treatment as well, as essentially specific. It is becoming a little doubtful, however, whether the results obtained do depend, as was at one time thought, upon anything so very specific in the vaccine or sera employed; it is at any rate emerging that a non-specific vaccine may sometimes be helpful—and not merely helpful, but almost as good as or even better than a specific vaccine—in the treatment of particular maladies.

To express this idea in a more concrete form—it would formerly have been regarded as useless to employ for a gonococcal infection anything but a gonococcal vaccine, yet it is now clear that some gonococcal affections at least can be much benefited by injections of typhoid vaccine, for example. In other words, the benefits that result from injections of peptone solutions do not depend entirely upon absolutely specific substances in that which is injected, but upon the particular kinds of foreign proteins which these injections may happen to contain. In a similar way Cleland[1] noticed how greatly certain sufferers from fibrositic infections and rheumatoid arthritis benefited as regards their joint and other troubles during the widespread influenza epidemic of 1918–19 when they received—as the greater part of the population did—prophylactic inoculations of blunderbuss influenzal and catarrhal vaccine.

It is because of unexpected benefits derived in this way from injections of solutions of foreign proteins, given for other purposes and not specific for the condition benefited, that the whole subject has received a very wide amount of attention for several years past, and the deliberate use of foreign proteins given by injection for therapeutic purposes is extending, and seems likely to afford an increasing field of usefulness in the direct treatment of various kinds of patients and maladies. The use of specific injections seems to be guided by relatively easy indications so long as the theory holds good that for each micro-organism the substance to be given is to be specific against that micro-organism. The new state of affairs, discovered more or less empirically, leaves one without the guide of direct specific logic, and without some curb there is a very great danger that with the usual swing of the pendulum, associated with the early enthusiasm that new ideas of this kind produce widely both in the medical profession itself and amongst the laity, a great deal more may perhaps be expected from the use of non-specific protein injections for therapeutic purposes than the test of time and experience will prove to be possible; and here, as elsewhere in medicine, it is extremely difficult to sift the true and useful grain from the huge bulk of chaff represented by numbers of immature papers and reports upon the subject that are to be found in the recent literature of other continents besides Europe.

When, however, one begins to think of how cures of microbic and other infections are brought about, one realizes that what W. F. Petersen[2] has written upon the subject of non-specific reaction summarizes the position very fairly. He says that during the course of the last six years a method of therapy has been developed that seems of interest not primarily because of the clinical results achieved, but rather because this method of therapy promises to exert a far-reaching influence on medical thought and theory concerning the factors that are active in recovery from disease. Since the general profession is still to some extent unfamiliar with the clinical results and the experimental work in this particular field, it may be permissible to discuss briefly two misapprehensions that are commonly current in regard to non-specific therapy: (1) That it represents a new and heretofore unknown and unused method of treatment; (2) That, immunologically illogical, it is purely empiric in character.

At first glance, after thirty years or more of satisfactory effort to perfect specific therapy, it might indeed seem illogical or even a step backward to study non-specific methods of therapy; but if we analyze the subject for a moment we will see that this is by no means true. Let us consider inflammation. We find this reaction fundamentally similar, no matter what the cause of the injury, whether it is bacterial, toxic, chemical, or traumatic. While there may be minor differences in the amount or the composition of the exudate, in the degree of the vascular alteration, or in the type of cellular reaction, the fundamental alterations are always alike. We deal with the effort of the organism to dilute the noxious agent, or neutralize it, to remove it by extracellular or intracellular digestion, and—that failing—to wall it off, to put it outside the current of organ activity. If, now, we seek to alter this process therapeutically, we have two means of approach. The one is interested solely in the cause of the inflammatory reaction: if a bacterium, to produce a bactericidal substance; if a toxin, to produce an antitoxin; if a chemical, to neutralize the chemical agent. We see at once that so far as the causes of inflammation and of tissue injury may be unlimited, our *specific* agents would have to be unlimited also. Our only other possibility lies in the endeavour to alter the reaction of the body, that is, to alter the inflammatory reaction—accelerating or retarding it as may be desirable—rather than trying to alter the agent that has caused the injury. It is at once apparent that here we must deal with substances that have a general effect on cellular activity, with non-specific rather than with specific substances. And from this point of view we are finding that a long list of therapeutic agents, including a great many organic substances as well as chemicals and drugs, have in all probability a common, and pharmacologically a simple, mode of action.

It is probable that every foreign protein when absorbed into the body from the alimentary canal or by subcutaneous or intravenous injection causes one or other of the tissues of the body to produce in retaliation certain chemical substances, differing in different cases, but having this in common, that they would not have been produced if there had not been this ingestion or injection of the foreign protein from without. Even if this is not true of all foreign proteins injected or ingested, it is certainly true of some, and a familiar example is the reaction, shown more by some individuals than by others, after a subcutaneous injection of horse serum. One need not elaborate the symptoms of serum disease, its latent period of about eight days, the way it shows itself when the patient is otherwise quite well—by pyrexia, lassitude, aches and pains in various parts of the body, more acute pains in the joints or muscles, perhaps vomiting, and most characteristically of all by the skin phenomena, especially urticaria. These results come about not in consequence of any 'anti' substances, whether antidiphtheritic, antistreptococcal, or antitetanic, contained in the serum, but as a result of the introduction into the living human body from without of the foreign proteins contained in horse serum; and the behaviour of the body fluids or tissues generally is modified, as the result of this reaction to the injection or ingestion of the foreign protein, in a way which is little understood, but which is made use of to help the patient to suffer less than he did previous to the injections; the relief to cases of hæmophilia by this line of treatment being an instance in point. If one knew more about the substances produced in the living human individual in response to the injection of every kind of foreign protein available, one might be able to foretell by logical argument exactly what lesions the patient might be suffering from would be benefited by any particular injection, what conditions would be left untouched, what conditions, again, would be made worse; but our state of knowledge in this direction is so very imperfect as yet, that the discoveries made hitherto have been for the most part accidental, though there has been a semi-scientific thread of thought leading up to some of the discoveries that have been made; and although one would emphasize again—and very strongly—that one has to guard against being carried away by therapeutic enthusiasm, it does seem definitely established already that foreign protein therapy is of real value in certain cases at least in the following groups, each of which may be discussed in a little more detail presently, but which may be summarized as follows:—

1. Asthma treated by intravenous peptone injections.
2. Epilepsy treated by intravenous peptone injections.
3. Arthritis, fibrositis, and synovitis treated by intravenous peptone injections.

4. Subacute long-continued pyrexial infections (often of obscure origin) relieved or cured by intravenous peptone injections.
5. Hæmophilia treated by horse serum or foreign human serum injections.
6. Purpura treated by serum injections.
7. Desensitization of persons suffering from food idiosyncrasies by protein injections.

The above seem to have been more or less established as groups of conditions in which non-specific protein therapy has, at any rate in certain instances, been of definite value. If one were to give a complete list of everything that has been recorded by one observer or another as having been benefited in a similar way, one would fill a page, for foreign protein injections are being used at the present time for every conceivable malady, and it is not proposed to advocate them here as yet for certain conditions for which they have been advocated elsewhere, including ununited fractures (Petrault[3]), puerperal septicæmia (Gow[4]), typhoid fever (Miller[5], Nolf[6]), the arrest of hæmorrhage (Nolf[7]), the prevention of meteorism (Nolf[8]), paroxysmal hæmoglobinuria (Nolf[9]), acute suppuration and healing of wounds (Stracker[10]), adenitis, salpingitis, and mastitis (Carlo Chiaudano[11]), purpura[12].

1. Asthma Treated by Peptone Injections.

True asthma is to be distinguished from the many other conditions to which the term 'asthma' has often been applied erroneously—for instance, chronic bronchitis, cardiac 'asthma', renal 'asthma', thymic 'asthma', uræmic 'asthma'; and the peptone injection treatment applies solely to pure spasmodic asthma. This is not a disease, but a recurrent phenomenon occurring in unfortunate individuals who have particular idiosyncrasies, and the idiosyncrasy underlying the spasmodic asthma phenomenon is protean. In some the attacks are apparently due to nerve storms pure and simple, or to intrinsic disorders of the nervous system similar to that which perhaps underlies some cases of Raynaud's disease or other forms of angioneuroses. In others the attacks are due to upsets of the nervous system caused by a great variety of different chemical reactions in the body, and brought on in some as the result of partaking of one or other of a great number of different food substances, in others by the effects of animal products such as dog dandruff, horse manure, particles in the air, and so on and so on. In patient A the idiosyncrasy may be due to some quite ordinary food substance such as yolk of egg; in patient B yolk of egg may be quite harmless, but some out-of-the-way substance such as chicory may be the cause; in patient C it is neither chicory nor egg-yolk, but products derived from cats; in patient D it is due to something else; and there is apparently hardly any limit to the possible substances to one or other of which a particular individual may be susceptible so that as part of his reaction to the intake of these substances he is liable to that type of nerve storm which exhibits itself in the form of a paroxysm of asthma. In some, several different substances may be individually or collectively responsible for the attacks; but underlying the great majority of cases of asthma there seems to be some peculiarity of the chemical reaction occurring in the body as the result of the ingestion of something, either by inhalation or by the mouth. Even if this is too broad and bold a statement, there is in it, at any rate, a great deal of truth; and if only the patient's tissues and intrinsic chemical processes can be altered in such a way that he no longer reacts to the ingestion of these foreign substances in this hitherto untoward manner, he can be rendered less liable than previously to the paroxysmal phenomena of spasmodic asthma, and it sometimes happens that he no longer reacts to them at all and is thereby rendered free from the attacks. It has been found that the injection—

generally intravenous—of a solution of peptone sometimes serves so to alter the intrinsic chemical processes as the result of the antipeptone reaction that ensues in his tissues, that a patient hitherto susceptible to some particular foreign substance liable to cause asthma in him becomes no longer susceptible ; and it is in this kind of way apparently that solutions of peptone given intravenously may be of real therapeutic value in the treatment of an asthma case. One cannot say that we have as yet very exact knowledge of what dosage of peptone is the best, nor of just how many injections should be given with the greatest advantage ; nor do we know whether peptone is really the best protein to give, or alternatively whether one gets the best results with peptone by itself or with peptone associated with minute quantities of other proteins of the albumose or proteose types. But it has been established with fair certainty that it is good treatment in a certain number of cases of true spasmodic asthma to use a 5 per cent solution of **Witte's Peptone** in normal saline, sterilized, and generally supplied in bulbs ready for use, giving it intravenously with a hypodermic needle and syringe, and using for the first dose 5 min. of this solution, increasing each successive dose by 2½ min. unless or until the dose that is ultimately obtained produces either too marked a general reaction at the time or soon afterwards, or else too pronounced a rise of temperature, i.e., to over 101° F. during the twelve or eighteen hours succeeding the giving of the injection. Until one has further knowledge of the best dosage and frequency, the routine would be to give twelve doses altogether as above, repeating each dose about once every seven days. Sometimes the patient does not even stay in bed at all ; but there is often a quite considerable immediate reaction to the injection, with faintness, a sense of tightness in the chest, the development of a feeling of squeamishness or actual nausea or abdominal pain, with blanching of the face, and a tendency to collapse very shortly after the injection has been made, so that it is much wiser for the patient to be recumbent or in bed at the time the injection is given, and for him to remain so until it seems quite certain that there is going to be no reaction of this kind.

Some observers, instead of giving quite small doses of this kind, gradually increased, give rather larger doses and only four of them, or even three ; and then the routine would be to give $\frac{1}{3}$ gr. of the peptone dissolved in a few drops of normal saline for the first dose ; $\frac{1}{2}$ gr. for the second ; and $\frac{2}{3}$ gr. for the third, the repetition being made at intervals of about five days.

It seems highly probable that, when this line of treatment has been investigated further and more is known about it, experience will show that different types of cases may need different strengths of the peptone solution and variable dates of repetition of the dose. That the treatment does sometimes, by its antipeptone reaction within the patient, lead to very great amelioration of the tendency to attacks of spasmodic asthma, has now been established beyond doubt, though it is very difficult to tell beforehand which case is going to receive much benefit, which some benefit, and which perhaps none at all.

2. Epilepsy and Peptone Injection Treatment.

Even less is known about epilepsy than about asthma, and the relationship of epilepsy to intrinsic chemical peculiarities in the patient is by no means clearly established ; but it has long been held by many keen observers that a particular epileptic is more liable to attacks on one kind of diet than he is upon another ; exclusion of fish from the dietary will sometimes help one particular patient very much indeed ; exclusion of eggs, another ; and so on. There is, however, much less clear an association between epilepsy and food idiosyncrasies than there is between asthma and food idiosyncrasies ; yet, upon the theory that there is some kind of relationship between peculiar chemical processes in the body of an epileptic and the attacks he suffers from, attempts have now been made in many cases to treat epileptic patients by trying to modify their intrinsic metabolic processes by the administration of foreign proteins in a way allied to that which has been given above for asthma.

It is too early as yet to give anything like a judicial summary of the results, but from what has been observed so far it would seem that there is at any rate something in this line of therapeutics for these patients, and as time goes on one has a feeling that even more useful discoveries in this direction will be made ; at all events, in the meantime, when other measures fail to control attacks, it appears that the giving of intravenous injections of peptone is something further than the ordinary treatment that can be tried justifiably in dealing with this disease. Until more work has been done upon the subject it is hardly possible to say what the dosage of the peptone should be, or what the frequency of the repetition of the dose, and one can only summarize the existing very imperfect knowledge by saying that the technique suggested at present is very much the same as that which has been outlined above for asthma.

3. Varieties of Fibrositis Treated by Intravenous Injections of Peptone.

The way in which patients suffering from rheumatoid arthritis, synovitis, fibrositis, and other similar affections showed great improvement in these lesions when they were given large blunderbuss prophylactic injections of influenzal and anticatarrhal vaccine, was apparent to many during the big epidemic of influenza 1918–19, and the fact has been commented on in detail by Cleland,[1] who saw much of this kind of result in Australia. It was a purely fortuitous result, for the blunderbuss influenza and anticatarrhal vaccines were given not at all because the patients had developed fibrositis or rheumatoid arthritis, but because it became a routine prophylactic treatment for all individuals who had not yet suffered from influenza but who were in the midst of the influenza epidemic at the time.

In a very similar way it was observed again and again during the war that when antityphoid inoculations by T.A.B. had to be given to soldiers even when they were suffering from gonococcal arthritis, the rapidity of recovery from the gonococcal joint troubles was often very remarkably more rapid in those thus inoculated with the T.A.B. vaccine than it was in those with the same malady but without this inoculation being given. Neither the influenzal catarrhal vaccine in the one case, nor the typhoid vaccine in the other, was specific for the fibrositic or arthritic state from which the patient was suffering, yet here were two totally different kinds of non-specific vaccine, each, as it were, fortuitously used, but each bringing about unexpected improvement in the fibrositic and arthritic state. The sequence of events had been discovered in too many countries and by too many different observers for the facts to be controverted ; and the question was : How did the improvement from this use of a non-specific vaccine come about, especially in a condition which is always very troublesome indeed to treat and cure ?

Extensive investigations led observers to the conclusion that it was no specific antigonococcal or anti-influenzal or antigermal substance in the vaccine that was producing the benefit, but simply the peptone and other allied proteins produced in the culture media upon which the organisms had been grown during the production of the vaccine ; and as a test of the accuracy of this view, peptone solutions prepared from commercial peptone have since been utilized in the treatment of certain arthritic states, and though with certain material limitations, none the less with real benefit sometimes. Accident and not logical argument had thus led to the discovery of yet another type of valuable non-specific protein therapy.

It would seem, however, that much has yet to be learned about the culture media upon which the typhoid and paratyphoid bacilli have been grown in the preparation of the vaccine, for some unpublished experiments have shown that the reactionary results may be much greater if extract of ox heart is used, for example, than if horse flesh is the source of the bouillon or other culture medium employed for the cultures. One cannot as yet say which is the very best variety of mixed protein, such as is contained in T.A.B., for the treatment of these arthritic states, but the present tendency is to employ not large doses of non-specific vaccine at all, but simple solutions of peptone in normal saline. One cannot help feeling that a great deal more has yet to be discovered before it can be said that we know what is the best exogenous protein material to use, or what mixture of proteins and proteoses is likely to give the best result ; but doubtless some cases of otherwise resistant arthritis, of rheumatoid arthritis type and not necessarily gonococcal, do get very obvious relief from intravenous injections of peptone given in the same kind of way as has been advocated above for asthma, though there is no intrinsic reason why there should not be great latitude in both the frequency of the dose and the mixture of the exogenous protein ingredients employed.

One has no very clear idea of just how the treatment acts, but one can express, in a nebulous kind of way, the thought that the patient, when he thus receives the unexpected and strange protein into his blood-stream, reacts throughout his body tissues, producing antiprotein substances which did not exist there before, and thus as a side-issue produces chemical changes or substances which happen to be inimical to coccal or other infections of his fibrous tissues and joints. One does not conceive that there is any direct action of the foreign protein upon the disease underlying the fibrositis and the arthritis, but rather that the injection of the foreign protein causes the body as a whole to produce substances which it was not producing before, and, incidentally, when these substances are formed, they help the patient the better to throw off the infection from which he happened to be suffering. Anyhow, whatever the underlying theory, the fact is becoming established quite clearly that intravenous injections of peptone do help materially to relieve subacute joint conditions, not only gonococcal, but also when due to other micro-organisms that may be responsible for changes which come under the headings of fibrositis and infective peri-arthritis.

It has been mentioned above that there are many limitations to the success of the treatment ; for example, it is quite clear that when joints have become deformed from the effects of long-standing infective arthritis, they will not when thus disorganized become normal again as the result of the use of peptone solution injections. Pains are not always due to the inflammatory process itself, but often to mechanical disabilities and mechanical pressure upon nerves in the neighbourhood of parts which, having been inflamed in the past, are now no longer inflamed in the ordinary sense, though swollen and distorted. It is not this type of thing for which the peptone injections are good ; rather is it in the relief of the active subacute inflammatory exudative process which is the earlier lesion out of which the subsequent deformities and the pains associated with these deformities arise. The earlier, therefore, in a fibrositic or rheumatoid arthritic case, associated with definite and continued but relatively slight pyrexia, that the injections are employed, the greater is the benefit to be expected. If the condition has been present for many months or years, it would only be the changes that had been arising more recently in the progress of the disease that would be alleviated and cured, not the older, more permanent results of previous exudative inflammation. At the same time, it is not a question of merely using peptone injections and getting good results in cases that were going to do well anyhow; for again and again the benefit which patients, who have been ill for several weeks, and for whom various other kinds of treatment have been employed without giving relief, have received almost rapidly from the peptone solution injections, has been so striking that one could not avoid the conclusion that it was the injections themselves that were responsible for the improvement, and that it was really a case of *propter hoc* and not merely one of *post hoc*.

One would reiterate, however, that it is not every patient who benefits in this way, and it would be surprising if it were so, for one is making use of a very ill-defined line of treatment, without any scientific knowledge either of the best form of protein to use in the solution injected, or of the dosage, or of the kind of relationship of the particular protein and its dosage to the kind of microbic infection underlying the individual patient's fibrositic and periarthritic changes. The treatment may be tried in many cases without success, but this does not imply that it is not of real value; and if it is only in half a dozen cases out of a hundred that the improvements are obtained which one has now seen time and again, one cannot but acknowledge that in spite of the failures in many, this non-specific protein injection treatment is of sufficient benefit in some to be welcomed and used with discretion fairly widely.

4. Subacute and Long-continued Pyrexial Infection of Obscure Origin Cured by Peptone Injections.

One meets now and then with patients who are out of sorts without being absolutely ill, and who, when observed continuously, are found to have continuous pyrexia of a type which might suggest subacute infective endocarditis or a continued infection from coli bacilluria or some affection of that sort, and yet who, in spite of extensive hæmatological and bacteriological investigations, baffle exact diagnosis. They give a negative tuberculin reaction, and, though causing much anxiety for a time lest after all they should prove to be tuberculous, or the subjects of infective endocarditis or of some other fatal malady, yet nevertheless by not dying they seem to prove that their infection, whatever it is, is relatively mild even though so persistent.

The patients referred to may not be numerous, and it is difficult to define exactly the class of thing meant, but we all meet with them from time to time, and one becomes more and more at a loss to know what treatment to advocate and carry out, for whatever is done in the ordinary way seems to have no influence upon the continuation of the pyrexia and chronic ill health. Doubtless these patients are not all infected by the same micro-organisms, and if we were yet more successful we should elucidate the bacteriological cause of their complaint; but from a medical point of view the question which does arise is: What can one do next to cure this patient?

Peptone injections given intravenously, and sometimes even only two injections of 5 c.c. of a 5 per cent solution, will occasionally alter the whole course of things completely, and without any apparent rhyme or reason the patient thereafter begins to feel better, eats better, loses the pyrexia, and makes a definite and often rapid recovery. It is more than likely that foreign proteins injected intravenously in this way might help to modify for the better and cure much more serious infections; and they have been advocated even in the course of acute post-puerperal septicæmia. One feels, however, less confident in advising them in patients who are already acutely ill, at any rate until more experience has been gained. When, however, the patient is not so seriously ill and not in any apparent danger, one feels that the giving of peptone injections in this way in small repeated doses is safe, and the fact that some at least of the patients are so much benefited by them when other measures have failed, shows that it is a therapeutic measure which can be definitely advocated.

5. Hæmophilia Treated by Injections of Normal Horse Serum.

Although a good many dogmatic statements have been made as to the exact pathology of hæmophilia and the diminished clotting power of the blood that is associated with it, we do not really know precisely what the error in the blood condition is that a hæmophilic patient has inherited; but that it is due to some variety of abnormality in the intrinsic chemistry of the blood is probable. If the injection of foreign proteins into an individual leads, by reason of the antiprotein reaction which results, to alterations in the intrinsic chemistry of the individual, it should be possible by means of some such injection so to change the chemistry of the hæmophilic's blood as to make him a sufferer from his disability in a greatly diminished degree, or even to cure his disability altogether. Many attempts have been made in this direction, and perfection has not yet been attained, but there is no doubt about the value of injections of exogenous serum in the treatment of the condition. Serum from another human being may be employed, but horse serum, already obtainable on the market ready for injection, serves well in many cases. One cannot lay down any absolute rules as to exact dosage or frequency of repetition of the dose, but in an average case 20 c.c. of sterile horse serum is given subcutaneously into the flank at a time when the patient is not suffering from active hæmophilic symptoms such as acute hæmorrhage into a joint. Little or no trouble results, and although there may be some hæmatoma formation at the site of inoculation, even this complication does not necessarily occur, and there is no particular liability to serum phenomena such as urticaria or joint pains on the eighth or ninth day after the injection in the way that might have been expected. Even when the serum phenomena result they are but temporary; during the twenty-four hours immediately following an injection there is generally a transient rise of temperature, and the patient should be kept in bed until this has passed. How many hæmophilic patients are liable to become hypersensitive to the serum we do not know, but we have not met such a case, although the routine treatment has been to repeat the 20-c.c. dose of horse serum in a month's time and thereafter at monthly intervals for many doses. It is rather important to give the injections slowly if bruising is to be reduced to a minimum, but one does not know how many times the injections should be repeated altogether. It may be that it would be wise to go on monthly for two years and then to give an occasional dose at longer intervals, but even from a small number of doses there is often a great improvement in the patient's tendency to bleed from small scratches and abrasions, and in those patients who have hitherto been liable to hæmorrhagic effusions into the joints these complications may be entirely prevented from recurring.

If there is any fear of anaphylaxis and the phenomenon designated colloidoclastic shock, measures directed towards minimizing any tendency to this can be adopted by mixing the serum with an equal volume of 5 per cent solution of hyposulphite of soda (see p. 32).

6. Purpura Treated by Horse Serum Injections.

Purpura is not a disease but a symptom, resulting from the effects of many and various disease processes: some microbic toxins, e.g., in septic states; some chemical, e.g., from iodides; some due to errors of metabolism, e.g., scurvy; and others perhaps to different groups of causes or combinations of them;

so that when one speaks of the treatment of purpura one should really be speaking of the treatment of that condition causing the purpura in a particular case. There are, however, some cases in which the purpura occurs without known cause; and when this is so, there is a tendency to regard the purpura itself as the disease, though there must really be an underlying cause for the symptom, even though it is not discovered. There are probably many varieties of this type of case, and it does not imply that we understand the pathology of the condition any better when we give a definite name to it such as Henoch's purpura than when we give no special name to it, but designate the condition purpura simplex or purpura hæmorrhagica. If we knew more about the underlying pathology of this type of case we should be nearer to success in treating it; but it is known from actual experience that injections of exogenous serum given subcutaneously do lead to amelioration of the purpuric state in many cases of the kind, so that purpura may be added to the list of conditions in which exogenous protein therapy does good. Whether normal horse serum is the best to employ for the purpose we do not know; it is more than likely that sera from other animals or from human beings might do better still; but on the other hand there is equal possibility that these other sorts of sera might do harm instead of good. It has at any rate been discovered that the giving of 20 c.c. of normal horse serum into the deep subcutaneous tissues of the abdomen, flank, or elsewhere, is often followed by a diminution in the hæmorrhagic tendency exhibited by the patient, the way in which this occurs being comparable, one supposes, with the way in which hæmophilia is relieved, as just described.

Purpuric cases are much more acute as a rule than is hæmophilia, and it is impossible to lay down absolute rules as to when the serum should be repeated; but, generally speaking, in a moderately acute case of purpura one would give a second dose of 20 c.c. of normal horse serum on the second day, a third dose of the same size on the third day, and thereafter decide by the circumstances of each individual case whether to give further doses or not. Seeing that the phenomena of serum disease are apt to develop about the eighth day after an injection of horse serum, it would generally be wise to desist from giving further injections after the sixth day, and then the risks of anaphylaxis, and liability therefore to sudden death from colloidoclastic shock, are such that one would feel far from confident in giving further doses until a period of weeks had elapsed. Even then one would feel dubious about repeating the serum after so considerable a quantity had been given during the first week. Even a single dose, however, often gives considerable relief to the purpura, and unless there are obvious contra-indications at the time, there is generally no reason why the dose should not be repeated daily for six days.

MILK INJECTIONS INSTEAD OF PEPTONE OR SERUM.

Several observers, e.g., Stracker,[10] advocate the use of intramuscular injections of sterilized milk in the treatment of patients suffering from chronic septic troubles—sinuses, discharging amputation stumps, and so forth; 10 c.c. being given at a time, and the dose repeated daily for many days. The data for judging whether this is a valuable line of treatment or not are as yet insufficient; but the fact that milk is being thus employed by some is mentioned here particularly because it shows that when speaking of foreign protein therapy in general one should not confine one's attention entirely to peptone solutions, nor to non-specific vaccines, nor to horse serum. It seems likely that various other foreign proteins may produce beneficial results in certain conditions when given by injection; but the time is not yet ripe for giving any precise summary of their value in actual practice.

DESENSITIZATION TO FOOD IDIOSYNCRASIES.

The average person is able to eat all the ingredients of ordinary human mixed diet without suffering ill effects, if he eats them in proper quantities and in the right way. Some unfortunate individuals, however, find it impossible to eat certain things without the penalty of subsequent urticaria or an acute abdominal upset or other evidence of personal idiosyncrasy and inability to deal with this particular food substance with impunity. Whether it is the actual foods which upset him, or whether on the other hand the individual, having ingested the particular foodstuff, produces within himself an antifood protein body to which he is too sensitive, is uncertain. Two very familiar examples of what I mean are strawberries and crab; the majority of people can eat strawberries without being ill, but some cannot eat even one strawberry without being upset and possibly developing severe urticaria; similarly in regard to crab. Now, although these two substances are familiar to everyone —lay and medical alike—in this respect, it is less generally recognized that some individuals are similarly upset by one or other of a great variety of other food substances which ought not to upset an ordinary human being. They have a food idiosyncrasy, and it is by no means necessarily imagination on their part. Though there are many who attribute their symptoms to some particular article of food without reason, there are definitely individuals who cannot take cow's milk without being ill; there are others who cannot eat eggs without being upset, and this even when the eggs are disguised so that the patients do not know they are eating them at all. Some cannot take a glass of champagne without coming out into blotches on their legs; and so on. In the process of growth it is probable that a child hitherto brought up on nothing but its mother's milk, but coming to the stage when change has to be made in the direction of other foods, has to get his internal chemistry readjusted to this change, and in the process of readjustment there may temporarily be quite considerable upsets; and yet as time goes on and the child continues with the primarily upsetting food, an immunity to it is, as it were, developed, and that which upsets at first does not do so later on. There seems little doubt, for example, that a change from mother's milk to cow's milk will upset some children very much indeed, but with continuance of the cow's milk dietary the upset ceases to recur. Some children when first put on to eggs develop severe gastro-intestinal disturbances in a similar way until they get used to this food. It would not be surprising if some individuals never develop the power of getting used to the ingestion of the foreign proteins that their interior has to learn to deal with, and when this is the case they have a continued idiosyncrasy.

Nor is it only to foods that this applies. We all inhale the pollen of grasses in the early summer. One does not know how to judge the effect of grass-pollens upon the child the very first time it inhales them, but most children develop an immunity to the pollen itself and the antipollen substances that their bodies produce when the pollen is thus taken in. A few never do so, and these are the sufferers from recurrent hay fever.

With these few examples in mind, it opens up a very wide field when one thinks how many different symptoms, not merely urticarial on the one hand, or gastro-intestinal on the other, or in the form of coryza on a third; but quite different symptoms such as recurrent headaches, bilious attacks, possibly the cyclical vomiting of infants, perhaps even the phenomena of so-called congenital pyloric stenosis of babies, may be the result of idiosyncrasy to some substance, protein or otherwise, which is ingested by the individual in the ordinary course of eating and living.

The way in which attacks of true spasmodic asthma may be due to persistence of food or other idiosyncrasy in this way has been referred to earlier in this article, and when one realizes how common it is to have a tendency to hay fever in the same individual as is the tendency to spasmodic asthma, one sees how, when there is already one idiosyncrasy, there is liability to another, owing perhaps to the peculiar chemistry of the individual.

It is also a remarkable thing that people with the idiosyncrasy which is in the form of spasmodic asthma, are also far more liable than is the average person to that troublesome form of idiosyncrasy which is known as serum anaphylaxis; that is to say, a tendency to die almost suddenly from a second injection of serum when a previous dose of serum has been given within the last few weeks. Much, very much, has still to be learned about the chemical phenomena underlying these food idiosyncrasies, these pollen idiosyncrasies, these serum idiosyncrasies; and the last few years have seen a considerable beginning of the investigations; so much so, indeed, that an elaborate series of skin tests has been devised in an attempt to ascertain whether a given individual is unduly susceptible to the effects of this, that, or the other foodstuff or foreign protein.

The whole subject is so fascinating that enthusiasm is already leading many to expect more from this type of research than can as yet be said to be of proved value; but it is only by knowing the methods that are being adopted that further work can be done with them. If it is thought that some food product, or some foreign substance such as grass-pollen or dog dandruff, may be responsible for particular disorders and symptoms in any individual patient, something can sometimes be learned in confirmation of this by testing the patient with dried extracts of all kinds of food products and other things that are now available for the purpose.

The procedure is more or less like that of doing multiple von Pirquet reactions, using, however, the dried extracts instead of the tuberculin which was used by von Pirquet. Dozens of tiny areas are scratched in regular sequence upon some surface of the body, such as the forearm, and into each successively is rubbed the product to which it is desired to test the sensitiveness of the patient.

Americans have been doing a great deal of work in this direction, and as an indication of the kind of extracts employed the following list of those at present available may be given; other substances will doubtless be added:—

Food Proteins for Cutaneous Tests.

Almond
Asparagus
Banana
Barley
Bean
Beef
Beet
Blackberry
Bluefish
Brazil nut
Buckwheat
Cabbage
Cantaloupe
Carrot
Casein
Cauliflower
Celery
Cheese
Chestnut
Chicken
Clam
Cocoa
Codfish
Coffee
Corn
Crab
Cucumber
Duck
Egg-plant
Egg-white
Egg (whole)
Egg-yolk
Fig
Ginger
Goatmeat
Goose
Grapefruit
Guinea-hen
Haddock
Halibut
Herring
Lactalbumin
Lamb
Lentil
Lettuce
Lima bean
Lobster
Mackerel
Milk (breast)
Milk (cow)
Milk (goat)
Mustard
Oat
Onion
Orange
Oyster
Parsnip
Pea
Peach
Peanut
Pear
Pecan
Perch
Pike
Pineapple
Plum
Pork
Potato
Radish
Raspberry
Rhubarb
Rice
Rye
Salmon
Scallops
Shad
Smelts
Sole
Spinach
Squab
Squash
Strawberry
Sweet potato
Tea
Tomato
Turnip
Turkey
Veal
Walnut (English)
Wheat (whole)
Wheat gliadin
Wheat globulin
Wheat glutenin
Wheat proteose
Wheat leucosin

Incidentals:—Beef serum, Horse serum, Tobacco.
Mouse hair, Orris root, Mushroom.

Epidermal Proteins for Cutaneous Tests and Treatment.

Cat hair
Cattle hair
Chicken feathers
Dog hair
Goose feathers
Horse dander
Rabbit hair
Sheep wool

Bacterial Proteins for Cutaneous Tests and Treatment.

Staphylococcus pyogenes aureus
,, ,, *albus*
,, ,, *citreus*
Micrococcus tetragenus
,, *catarrhalis*
Diptheroid
B. pertussis
B. coli communis
Streptococcus viridans
,, *hæmolyticus*
,, *non-hæmolyticus*
Pneumococcus, type 1
,, ,, 2
,, ,, 3
Friedländer's bacillus

Pollen Proteins for Cutaneous Tests and Treatment.

+ = Early spring. ++ = Late spring and early summer. +++ = Late summer.

Gramineæ—
Timothy ++
Red top ++
Orchard grass ++
June grass ++
Corn +++
Compositæ—
Goldenrod +++
Fleabane ++
Ragweed (short) +++
Ragweed (giant) +++
Cocklebur +++
Goldenglow +++
Sunflower +++
Daisy ++
Dandelion ++
Dahlia +++
Leguminosæ—
Alfalfa +++
Clover (trifolium) ++
Sweet Clover (melilotus) ++
Salicaceæ—
Poplar +
Willow +
Miscellaneous—
Rose ++
Birch +
Elm +
Maple +
Oak +
Pine +
Privet ++
Walnut +
Greasewood ++

If the patient gives a strong reaction at one of the inoculated spots it is regarded as evidence that he is unduly susceptible to this particular substance; if, for example, in a case of asthma the whole series of inoculations is carried out, and the patient's skin reacts negatively to everything except, we will say, egg-white and the extract of dog hair, this is regarded as indicating that in that patient's dietary egg-white should be excluded, and that there should be no dogs kept in the patient's vicinity, and so on.

It seems hardly likely that the matter can really be so simple as this, and it is far too early to give any definite opinion as to the value or otherwise of this line of investigation; but sufficient cases of definite and useful knowledge obtained from skin reactions in this way have been recorded to make one realize the possibilities of the thing being of still greater value in the future, when it has been tried more extensively, its pitfalls and imperfections have been discovered, and a good deal more has been learned than we know at present.

When, however, these skin reactions have led to the idea that a particular individual is unduly susceptible to a particular food or other foreign protein or chemical substance, it is asserted that much can be done to make him less sensitive to this thing by subsequently giving him, by injection subcutaneously or intravenously, tiny but increasing doses of the extract of the particular substance to which he has the idiosyncrasy. This method has been employed in the relief of some cases of asthma, for example; but if the future shows that many other maladies besides asthma are attributable to personal idiosyncrasy to some particular foreign substance, and if beyond this it is confirmed that the patient can be desensitized to the substance by receiving a course of inoculations prepared from it, there will be a very wide opening up of that field of treatment which has been designated foreign protein therapy. (*See also* Skin, Protein Sensitization in.)

References.—[1]*Agent-General's Report*, New South Wales, 1920; [2]*Jour. Amer. Med. Assoc.* 1921, Jan. 29, 312; [3]*Ibid.* April 2, 966; [4]*Quart. Jour. Med.* 1921, Jan., 187; [5]*Jour. Amer. Med. Assoc.* 1921, Jan. 29, 308; [6]*Arch. méd. Belges*, 1917, lxx, 97; [7]*Comptes rend. et Mém. Soc. de Biol.* 1916, lxxix, 648; [8]*Ibid.*; [9]*Presse méd.* 1918, xxvi, 485; [10]*Surg. Gynecol. and Obst.* 1921, Feb., 127; [11]*Policlinico* (sez. chir.), 1921, Feb., 50; [12]*Presse méd.* 1921, March 5.

NYSTAGMUS. (*See* Industrial Health; Ophthalmology, Preventive.)

ŒSOPHAGOSCOPY. (*See* Endoscopy, Peroral.)

OPHTHALMIA NEONATORUM. (*See* Eye Affections, General: Gonorrhœa.)

OPHTHALMOLOGY, PREVENTIVE.

Lt.-Col. A. E. J. Lister, I.M.S.

J. H. Parsons[1] deals with preventive ophthalmology in an article that is well worth reading in full. Its objects are considered under two main headings:—

1. *The Prevention of Damage to the Individual.*—Prevention of damage to the eyes from accidents, defective illumination, micro-organisms, etc.; prevention of damage to health from accidents, fatigue, headaches, etc. Much money is lost owing to the time wasted through preventable accidents to the eyes. Workmen are often unwilling to wear the protective goggles which are now generally provided without charge by their employers. It is suggested, as a possible means of increasing their use, that the employer should be relieved of all liability should accidents occur to the eye when not worn. The efforts of welfare workers are needed to remove the suspicion of the men that preventive measures are not solely in their interest. 'Safety first' propaganda is needed. The deleterious action of ultra-violet radiation on the eyes is discussed. Infra red (heat rays) may also have a potent effect; this is of importance, on account of the high temperatures employed in many industries. Careful regulation of the amount, quality, and distribution of light in schools, libraries, factories, etc., is required; the illumination of such buildings is, at present, usually poor. An investigation by ophthalmologists is required to estimate the effects of errors of refraction, errors of muscle balance, defective illumination, etc., on the fatigue of workers in the different processes of various industries. The eyes of school children should only be examined by properly qualified men, with actual experience in clinics; and it is suggested that ophthalmic clinics should be established for this purpose in different parts of the country.

2. *The Prevention of Damage to Other People.*—Regulations (*a*) for the prevention or the transference of contagious diseases, (*b*) regulations for the public services, navy, army, air forces, mercantile marine, railways, motor industry, cinemas, etc., come under this heading. Too little attention, in Parsons' opinion, has been paid to good printing, its visibility, legibility, eye-saving characteristics, etc. The printing of music is a matter that needs consideration; attention should be paid to the distance at which the particular performer has to place his music. The violinist will require larger notes, as he has to read them twice as far away as the pianist.

C. Goulden, at a recent lecture at the Royal Society of Medicine not yet reported, dealt fully with accidents to the eyes in industry, and their prevention. He showed a pair of goggles which had only been worn a few months by an emery-grinder. Both glasses had been extensively damaged by the sparks flying from the wheel, emphasizing in a very forcible way the value of such protection. We think the showing of such a pair of glasses to unbelieving workmen would do more to convince them of the value of wearing goggles than any amount of talk.

Miner's Nystagmus.—Lister Llewellyn also gave a lecture on miner's nystagmus, illustrated by a beautiful series of slides and photographs showing the actual conditions under which miners work, and the illuminating effect of different kinds of lamps and candles. This disease costs the community about a million pounds a year in loss of production and compensation—to say nothing of the suffering and industrial discontent caused.

Martin[2] considers miner's nystagmus to be a functional disease of the central nervous system. He discusses in detail the miner's mode of living. He considers that exhaustion, due to hard work with inadequate food and rest, is the most effective cause of the disease. The miner has usually a scanty breakfast, and has only fifteen minutes to eat his mid-day meal, which means that it is 'bolted'. When he reaches home, tired out, his digestive organs are taxed by having to deal with a heavy meal, often washed down by much tea. Martin cites evidence to show that the old system under which the miner had forty minutes in the middle of the day, in which to take his food in comfort and to rest a while, was less productive of the disease than the present system. He advocates a rest of forty minutes for the miner as for other workmen, as well as due attention to the illumination of the mines.

[Truly preventive ophthalmology is an important and very practical subject. It is only by the efforts of the medical profession as a whole that real progress will be made. There is one way particularly in which practitioners can render valuable help. Children learn to read at a very early age now. In small families especially, one of the commonest ways of keeping a child quiet is to give it something to read. Parents' attention should be called to the necessity of seeing that the print is at least reasonably good and that the child reads in a good light.—A. E. J. L.]

REFERENCES.—[1]*Trans. Ophthalmol. Soc. U.K.* 39, 269; [2]*Brit. Med. Jour.* 1920, Nov., 814.

OPTIC NEURITIS. *J. Ramsay Hunt, M.D.*

Optic Neuritis in Encephalitis Lethargica.—The literature of encephalitis lethargica contains but few references to changes in the fundus oculi or disturbances of visual function. Macnalty, in the Local Government Board Report of 1918, reports that in 50 cases the fundus oculi was systematically examined; in one case the retinal vessels were somewhat indistinct, but in no case was true papillœdema seen. Morax and Bollack state that they have never found any impairment of visual acuity, contraction of the fields, or changes in the fundus in encephalitis lethargica. On the other hand, Buzzard reports as encephalitis lethargica two cases showing papillœdema, both of which had symptoms of raised intracranial pressure, proved at operation to be caused by subdural extravasation of blood; microscopical examination of the brain in one of these cases showed changes typical of encephalitis lethargica. Vincent records two cases, diagnosed on good clinical evidence, in which visual acuity was grossly impaired and subsequently recovered, but he makes no mention of ophthalmoscopic examination. Bramwell, in a paper dealing with a wide experience of the disease up till May, 1920, says that changes in the fundus oculi are seldom met with, though in several cases he has seen engorgement of the veins: and in two cases in which the diagnosis was not absolutely certain, and which are not included in his series, an optic neuritis was present. C. P. Symonds'[1] record of four cases were all seen during the past summer in the United States. In each case definite changes were observed in the fundus oculi, together with clinical signs and changes in the cerebrospinal fluid which favoured their inclusion in the encephalitis lethargica group.

Optic Neuritis in Disseminated Myelitis.—In relation to the above cases it is worth while to consider the disease long known as acute disseminated myelitis. Under this purely anatomical heading have been included a number of cases of obscure pathology characterized by the presence of widespread patches of non-suppurative inflammation in the spinal cord. Delvie, in 1894, first drew attention to the occasional occurrence of optic neuritis in this disease. Dreschfeld, also in 1894, recorded two cases of it with optic neuritis, in one of which careful microscopic examination showed inflammatory changes in the optic nerves. In discussing the etiology, he says the toxic agents which so often give rise to peripheral neuritis may also affect the spinal cord, and quotes Fuchs' statement that in multiple peripheral neuritis very similar changes are sometimes seen in the optic nerves. In the association of optic neuritis with acute disseminated myelitis we have an instance of involvement of the optic nerves in a diffuse inflammatory process affecting the nervous system, analogous to the association of optic neuritis with encephalitis lethargica.

Reference.—[1]*Lancet*, 1920, ii. 1245.

ORTHOPÆDIC SURGERY.

E. W. Hey Groves, M.S., F.R.C.S.

Organization of Orthopædic Surgery.—By far the most pressing problem of orthopædic surgery to-day, is that relating to the special segregation of orthopædic cases and the general recognition of the surgery of the spine and limbs as a *specialty*, requiring institutions, departments, surgeons, and nurses devoted to its particular study and practice.

Sir Robert Jones[1] urges the reasons for this reform in two recent lectures, and his arguments—unanswerable in their logical force—must compel the attention of the profession, though corresponding action may be slow to follow. It is quite futile to debate what should constitute 'orthopædic surgery' or to discuss the meaning of the word 'orthopædic'. The fact which was known to the few before the war and is known to many since, is that the study of the spine and limbs, whether it be of the skeleton or of the motor mechanism, demands a special knowledge, experience, and personnel.

The surgeon who treats deformities should be the one to treat the conditions which lead to deformity, whether these be fractures of the bones or infections of the joints. It should not be the question of the rights of one surgeon as compared with those of another, but rather the broad problem of how best to treat a large and important group of cases, and how to train students and nurses in this treatment.

The great advance which operative surgery has made in the last generation, particularly in the field of the abdomen, has tended to convert the surgical wards of our hospitals into mere annexes of the operating theatre. Injuries and disease of the spine or limbs may or may not require operative attack, but they all demand long-continued observation, an accurate knowledge of appliances of all sorts, and many special methods directed to the restoration of function. These requirements necessitate that the surgeon should devote himself chiefly or exclusively to this work, in the same way that the oculist, throat specialist, or gynæcologist does to his special branch of the profession. Every large hospital should have a special department for the treatment of diseases and injuries of the spine and limbs, and this should include an ample number of beds (not fewer than 40 in a hospital of 300), a physiotherapy department, one for making splints and appliances, an efficient after-care organization so that cases may be kept under observation for months and years if necessary, and last but not least a country hospital affiliated to the city institution, where children suffering from surgical tuberculosis and other chronic crippling diseases may be adequately treated, educated, and trained in some suitable occupation. Girdlestone[2] deals with the latter point in some detail. The possibility and the practical necessities of such special hospitals for cripples have been demonstrated in certain pioneer institutions in this country; but there is an urgent need for many more such places, and also for a staff of medical men and nurses to work them.

A hospital for cripples, begun at Baschurch and now transferred to Oswestry in Shropshire, should serve as the best model in this country. It is notable for the very low capital outlay required, the wards nearly all being mere open-air shelters; for the fact that it is self-supporting, payments being received from the County Councils for all the in-patients sent by them; and also for the efficient after-care centres that have been established all over the country in connection with the primary hospital.

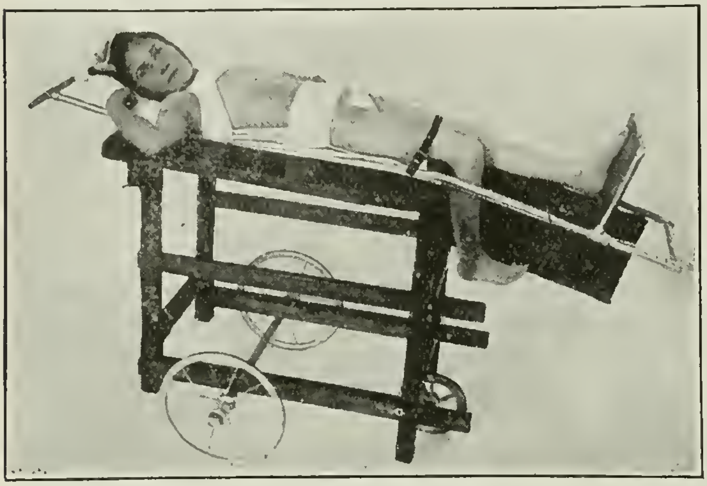


Fig. 58.—Pugh's frame on trolley.

Surgical Tuberculosis.—One of the largest and best-known school hospitals for crippled children is that under the care of Sir Henry Gauvain at Alton. The cases there are nearly all tuberculous, and Gauvain[3] points out that whilst the best possible results in surgical tuberculosis can only be obtained by conservatism, this by no means implies that treatment is the mere passive looking on whilst the child runs wild in the country. On the contrary, it needs patient care in the fitting of appliances and in the evacuation of tuberculous abscesses, the proper adaptation of appliances and occupation to the child, in all stages of his disease (*Plate XXIV*). In dealing with the statistics of over 2400 cases, he shows that in over 1900 an arrest of the disease might be claimed; that the mortality is only 2·5 per cent, and that the average duration of treatment is 416 days. Open-air treatment in a suitable country or seaside situation is the essential requirement for tuberculous children, and progress must lie in the direction of cheap, simple shelters and in good portable appliances so that the cripple can be in the open air during day and night, winter and summer.

Pugh,[4] who has charge of the largest institute for tuberculous children in this country, emphasizes these points and describes a very practical device for carrying them out. It consists in a frame made of gas piping in which the child is fixed, and by which deformity can be corrected. The frame can be placed on a three-wheeled trolley, and the child can then be moved with the least possible jolting (*Figs.* 58, 59).

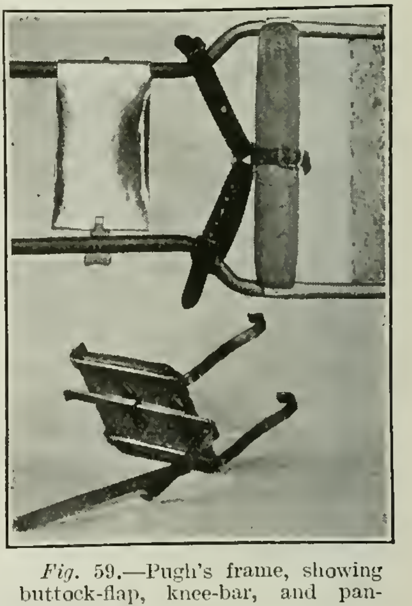


Fig. 59.—Pugh's frame, showing buttock-flap, knee-bar, and pan-holder (from below).

(*Figs.* 58 and 59 *by kind permission of the 'Lancet'.*)

Opinion is now almost unanimous that non-operative treatment should be

SURGICAL TUBERCULOSIS

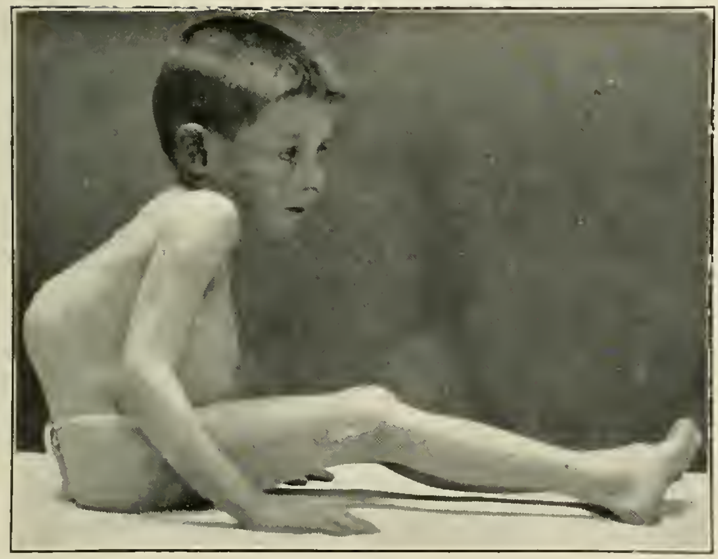


Fig. A.—Patient suffering from extreme angular curvature of the spine, the result of tuberculous disease.

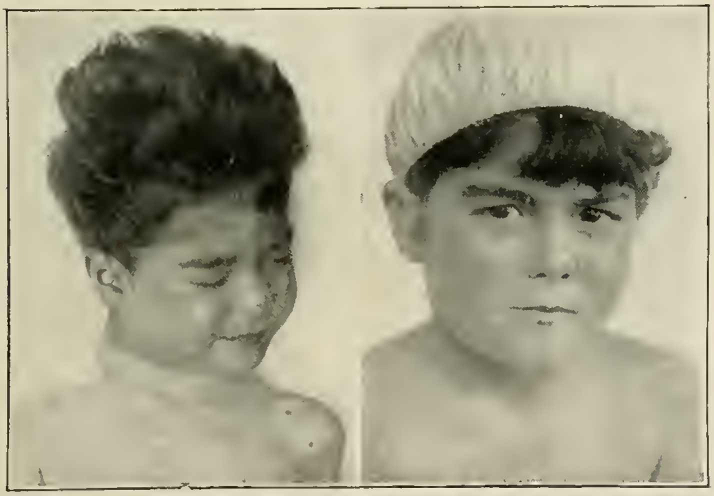


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Fig. C.—Patient suffering from multiple tuberculous lesions with much toxæmia. The lesions included cervical adenitis, tuberculous iritis with photophobia, tuberculous disease of hip-joint, and lupus.

Fig. D.—Same patient after treatment. All lesions healed. general condition good, movement has returned at hip-joint; there is no deformity.

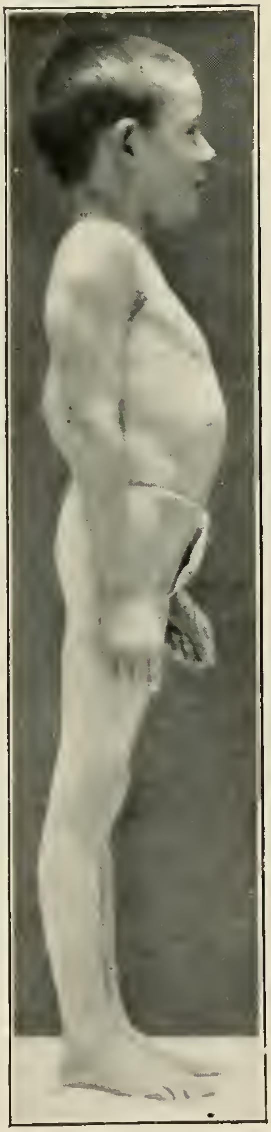


Fig. B.—Same patient as *Fig. A*, with the deformity largely reduced after treatment on the 'Marconi.' Further reduction of the deformity can now be obtained by using the 'swinging back-door splint.' (See *Lancet*, 1911, i, 568.)

By kind permission of the 'Lancet'

the rule with surgical tuberculosis. But there are certain affections in which there is still a marked difference in the practice of different authorities. Notably is this the case with *tuberculous disease of the knee-joint in children*. It is not always possible to send the child to an open-air sanatorium for six or twelve months, whereas resection offers a simple and comparatively rapid cure. But it should be borne in mind that after resection of the knee in childhood, even in the most favourable cases, prolonged after-care is needed to prevent gross deformity. This subject is discussed by Schwamm[5], who points out that if a large number of cases of resection of the knee in children are examined after an interval of a few years, over 70 per cent will be found to have such a high degree of deformity at the knee as to require some further operative correction (*Fig.* 60). The tendency to bending at the site of resection lasts for many years, and indeed will require apparatus for its prevention until the child is over 15 years of age. The author considers that the treatment of such deformities should be an osteotomy above or below the cancellous mass at the knee-joint.

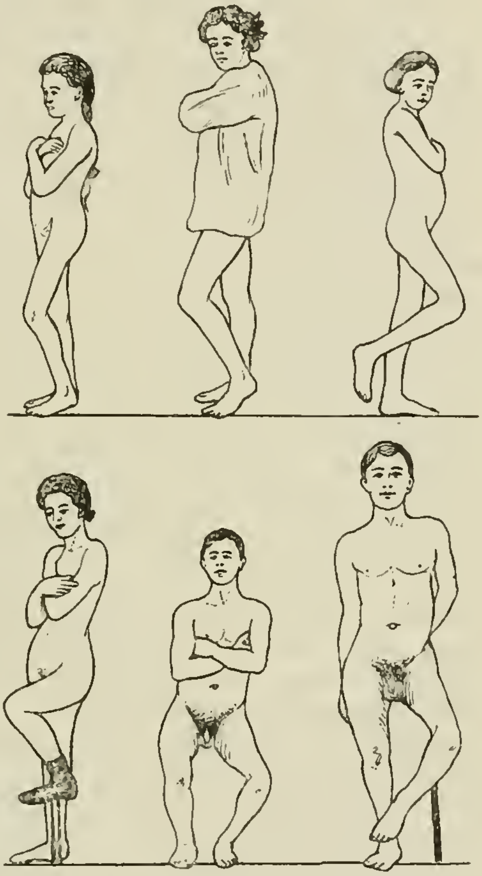


Fig. 60.—Cases showing late deformity after resection of the knee for tuberculosis.
(*Redrawn from the* '*Münchener medizinische Wochenschrift*'.)

Static or Postural Deformities (*see also* STATIC OR POSTURE SYSTEM).—The nature and treatment of certain deformities, of which scoliosis is the best example, are still far from settled. A few years ago it seemed hopeful that Abbot's method of placing plasters on the flexed spine with gradual forcible correction of the deformity, was going to solve the problem ; but now, beginning with the country where the method was first introduced, it is generally abandoned. Experience has shown that it is painful, tedious, and even dangerous, and that it does not really correct the deformity but merely disguises it. Bankart[6] has contributed an article on static deformities which carries conviction, though it does not lead to a very hopeful conclusion. He points out that there are many reasons for considering that muscle function is of a dual character, first that of active contractility, and second that of postural or tonic function. It is more than probable that these two functions are served by a different nerve-supply, the tonic function being derived from the sympathetic. Correct posture is maintained by muscle tone, and this is most manifest in those muscles which antagonize the action of gravity, such as the extensors of the hip and knee, and the erector spinæ muscles. This postural activity is a contraction of low tension, which is maintained for long periods without fatigue. It is difficult to produce by artificial stimuli, and it is easy to inhibit by reflex stimuli. This tonic activity is governed by a nerve centre in the cerebellum, which is developed in early life. At first the maintenance of posture is voluntary and active, but later it becomes involuntary and subconscious.

True *scoliosis* should be regarded as a failure of the tonic or postural activity of the muscles. It is a functional nervous disease, and may be one manifestation of neurasthenia. At first it can be corrected by voluntary effort, but this quickly leads to fatigue. True postural scoliosis is entirely different from other types, such as the occupational, rachitic, or paralytic, all of which are comparatively easily corrected. Myasthenia is present in a marked degree in all the scoliotic muscles, and is proved by a characteristic electrical reaction, namely a prompt response to electrical stimuli but rapid failure of response when these stimuli are repeated.

The great difficulty of correction lies in the fact that shortening rapidly occurs in the muscles and ligaments opposite to those lengthened. Treatment for scoliosis is only of any avail when it can be adopted in the early stages of the deformity. To whatever extent voluntary exercises can correct the deformity, to that extent only can cure be expected. Once the scoliosis has become fixed it cannot be remedied by forcible reposition : the only object of any apparatus will be to prevent the deformity from becoming worse.

Applying the same general ideas to the consideration of *flat-foot*, Bankart shows that the normal foot is maintained by the unconscious tone or postural activity of the muscles. Gravity tends to evert the foot and flatten the arch, while muscle activity tends to adduct, invert, and raise the arch. The mere size of the arch of the foot is the point of least importance, which is shown by the fact that savages often have perfectly flat but entirely efficient feet.

The morbid condition of flat-foot is caused by one of three antecedent conditions, namely : (1) *Neurasthenia*, or a loss of tone or postural activity ; (2) *Overstrain* ; (3) *Inflammation* ; this inhibiting postural activity. In this view of the condition the mere building up of the arch on steel or rubber supports is futile. The main treatment must always consist in tilting the sole of the boot so as to relieve the strain on the structures on the inner border of the foot. In attempting to tilt the foot it is often necessary to mould the in-sole so that the three points, heel, great toe, and outer border of the foot, shall lie embedded in sockets, and not slip on a plane surface when the foot is tilted. A final cure will always depend upon teaching the patient to walk with adducted and inverted feet.

Operative Treatment of Infantile Paralysis.—This is summarized and reviewed by Lovett,[7] and his conclusions are of very great value. No case of infantile paralysis should be allowed to drift into helpless recumbency. Practically every case can be taught first to walk, then to get out of a chair, and lastly to go upstairs. This applies at least to any case with one good arm and one crutch arm. Probably too much attention is paid to the obvious deformities of the foot, which can always be corrected by simple operative procedures aided by apparatus. The commonest obstacles to walking are, flexion contraction of the hips, combined with flexion of the knees and equinus of both feet. The first of these is best treated by Souttar's operation, which consists of an incision to the outer side of the anterior superior iliac spine, the muscles being peeled off from the crest of the ilium, the spine itself being chipped off by an osteotome. The leg is put up in extension in plaster-of-Paris ; after ten days this is increased to hyperextension. This procedure has a great advantage over simple transverse division of the contracted muscle, because it is not nearly so liable to be followed by a relapse. The flexion of the knee in paralyzed children requires some care in its correction. If the deformity is forcibly corrected at one sitting, there is great danger of a subluxation at the knee-joint occurring. It is better, therefore, to be content with a moderate degree of correction, putting the leg up in plaster. After twenty-four hours this is divided transversely behind the joint, and forced into a better position by wooden wedges. The third factor in the deformity which prevents walking is a double equinus. It is by no means satisfactory to divide the tendo Achillis in those cases where the deformity is due to paralysis of the leg. Such an operation may be followed by a flail foot. It is better to stretch the tendo Achillis by means of successive plasters, or, if the tendon is divided, an operation should be done which ensures the reunion of this structure in a lengthened condition. When once the three principal contractions of the hip, knee, and ankle have been remedied, the patient can always begin to walk by means of crutches, placed apart and slanted well forward, forming thus a tripod with the feet of the patient. From this stage onwards great improvement is possible by means of careful education. Bad walking is often due to paralysis of the gluteal muscles and of the muscles of the abdomen. Paralysis of the gluteus medius results in the patient being unable to lift the pelvis so as to swing the other leg forward. Paralysis of the gluteus maximus makes the patient unable to stand erect. The only help which can be given in these cases is by means of elastic bands passing across the buttock from a corset to a knee-brace.

In regard to the paralytic deformities of the foot, the author is inclined to be conservative in dealing with patients under 14 years of age. He considers that arthrodesis is most unsatisfactory in very young children, because it is liable to lead to greater deformities as growth advances. This criticism is applied to fixation of the ankle-joint, but probably fixation of the mediotarsal joint is not open to the same objection. He considers also that astragalectomy is an operation often abused because it is carried out as a matter of routine without sufficient after-care. In this, as in all other branches of orthopædic surgery, it is of paramount importance to remember that operations should only form a minor part of the treatment, which should consist very largely of painstaking re-education of function.

Recurrent Dislocation of the Shoulder.—Discussion on this subject and new suggestions for treatment go to show that opinion is still very unsettled. Ollerenshaw[8] introduced the matter by describing four cases in which the Clairmont operation had been done with success, and it was evident from the general tone of the discussion that this is at present the fashionable operation in this country. It consists in making a double incision to expose the anterior and posterior borders of the deltoid muscle. A strip of the posterior border is formed into a flap with its base above, and this is then passed through a tunnel made in the axillary muscles so as to wrap round the shoulder capsule. It is then sutured to the deltoid in front, or, better, to the subscapularis tendon.

Many reports give a favourable account of this operation ; but it certainly is a difficult one, and moreover seriously weakens the deltoid, which is the most important muscle of the shoulder. It is extremely unlikely that the deltoid flap functions as a muscle : after its transplantation it acts merely as a fibrous-tissue sling supporting the weakened inferior aspect of the capsule. If this is the case, then it would seem more logical to use a piece of fascia lata rather than to damage the deltoid. This has been proposed and performed by Schultz.[9]

Other slinging types of operation continue to be devised and described. Thus Evatt[10] suggests passing a stout silk ligature through the neck of the humerus and through the neck of the glenoid. This will serve both as a mechanical check to dislocation and also as a reinforcement of the capsule. Sandes[11] has carried out a more elaborate sling operation. He bores a hole through the surgical neck of the humerus 1 cm. in diameter, and through this he passes a long strip of fascia lata, the ends of which he crosses above the head of the humerus and then sutures over the upper surface of the clavicle, thus making a stout figure-of-eight fascial sling.

Some surgeons have attempted to prevent the dislocation by division of certain muscles. Sever[12] argues that the common type of dislocation always occurs when the arm is abducted, by the contraction of the pectoralis tendon, associated with a plication or shortening of the subscapularis tendon.

Thomas[13] has made a very careful contribution to this subject. He begins by emphasizing the importance of the site and nature of the essential lesion. This is either a rupture or lengthening of the capsule at its inferior aspect. Frequently the capsule is torn from its attachment in this situation from the edge of the glenoid fossa, or more rarely from the neck of the humerus. Clearly, if this is the case, then any operative attack should be made from the axilla and should fully expose the site of injury and the site of repair. This is best done by an axillary incision parallel to the great vessels, which are then drawn forward. The weakened portion of the capsule is plicated (*Fig.* 61). It would seem that Thomas's main contentions are beyond controversy, viz., that the site of injury is always the inferior part of the capsule, and that this should always be exposed through an axillary incision. Probably in bad cases it might be wise to supplement the simple plication of the capsule by a fascial graft or other form of reinforcement.

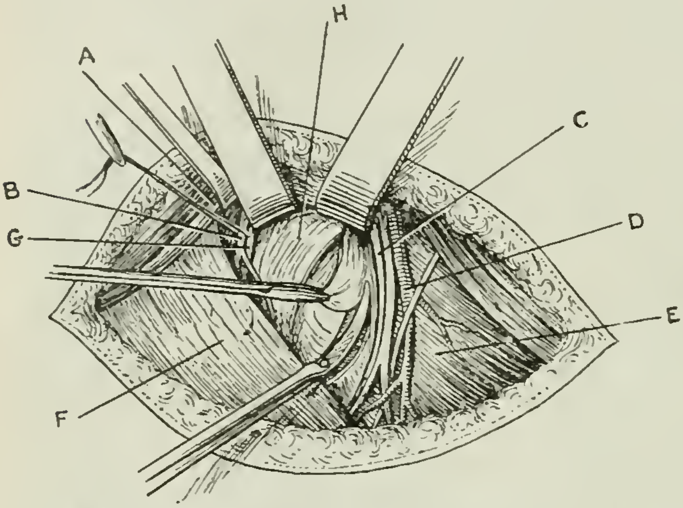
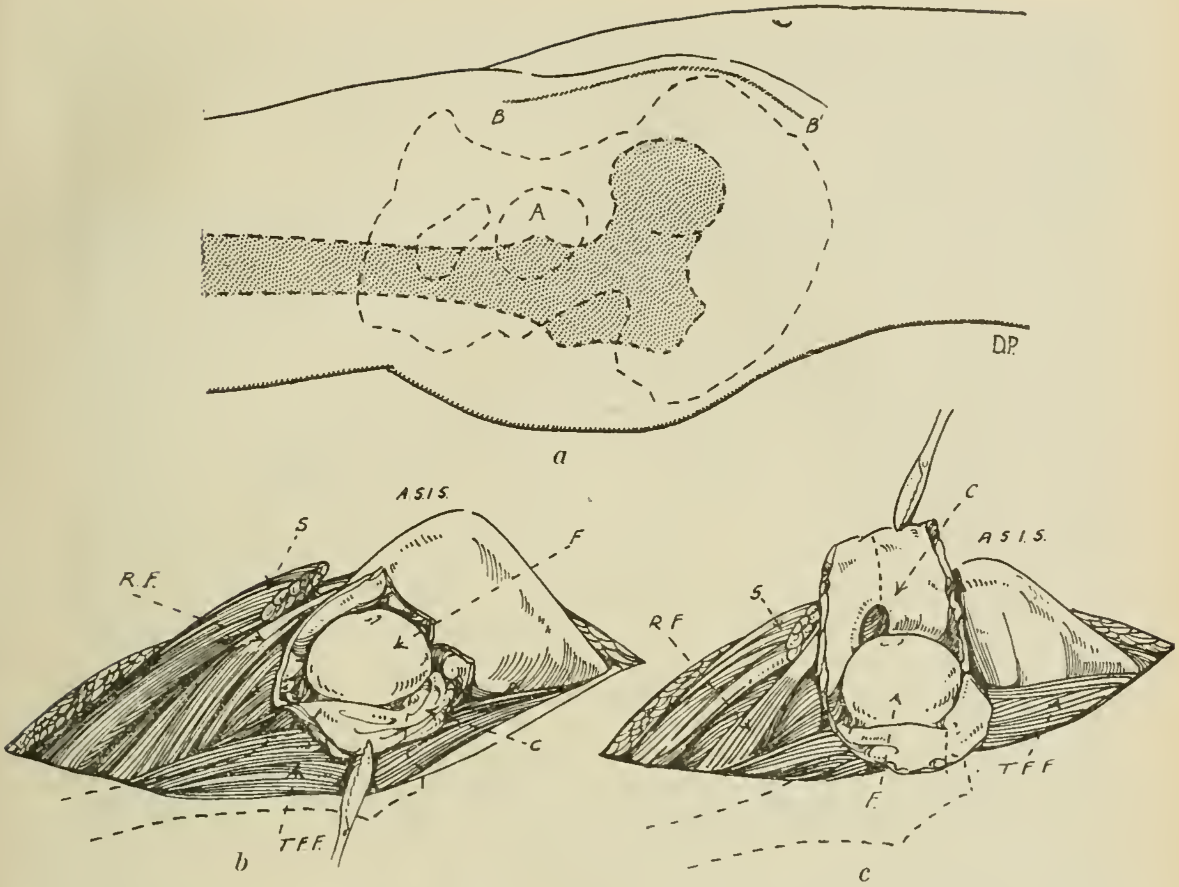


Fig. 61.—Showing the essential features of the capsule operation done through an incision posterior to the axillary vessels and nerves. It will be necessary only to locate, expose, and especially guard the circumflex nerve. (A) Axillary artery and vein; (B) Circumflex nerve; (C) Subscapular nerve; (D) Subscapular nerve to the latissimus dorsi muscle; (E) Subscapularis muscle; (F) Latissimus dorsi muscle; (G) Posterior circumflex artery; (H) Capsule.

(*Re-drawn from 'Surgery, Gynecology, and Obstetrics'.*)

Congenital Dislocation of the Hip.—This has been a subject of much discussion in recent years. There is far less certainty of opinion than existed a few years ago; this is due to two main factors: In the first place the simplicity, efficiency and durability of the manipulative method are challenged. In the second place the open operation has been so much improved that it offers a reasonable alternative to permanent crippledom.

The most notable challenge to the manipulative method has been given by an orthopædic surgeon of experience and repute, viz., Galloway.[14] He speaks of the poor results given in 31 cases, and describes the teachings of 'bloodless reduction' as 'seductive demonstrations'. He considers that all cases should be treated by the open operation, done preferably at the age of 2 to 3. But there need be no age limit for open reduction. In double dislocation both hips should not be operated on at the same time, but with an interval of eight weeks to a year between the operations. In most cases the anterior route is used, but in some cases the posterior. Judging from his description, the latter route is reserved for cases of exceptional difficulty in which the head and the neck of the bone are resected. His analysis of 38 operations, with 12 cures and 14 further good results, mentions many serious difficulties, dangers, and complications such as septicæmia, re-dislocation, motor paralysis, and necessity for excision. His teaching, therefore, will not find a ready acceptance. But his



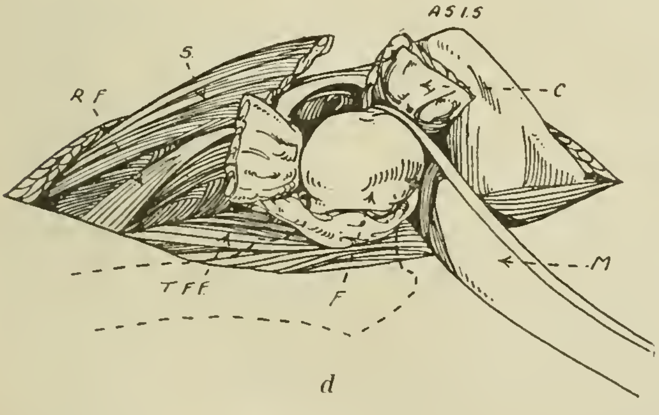
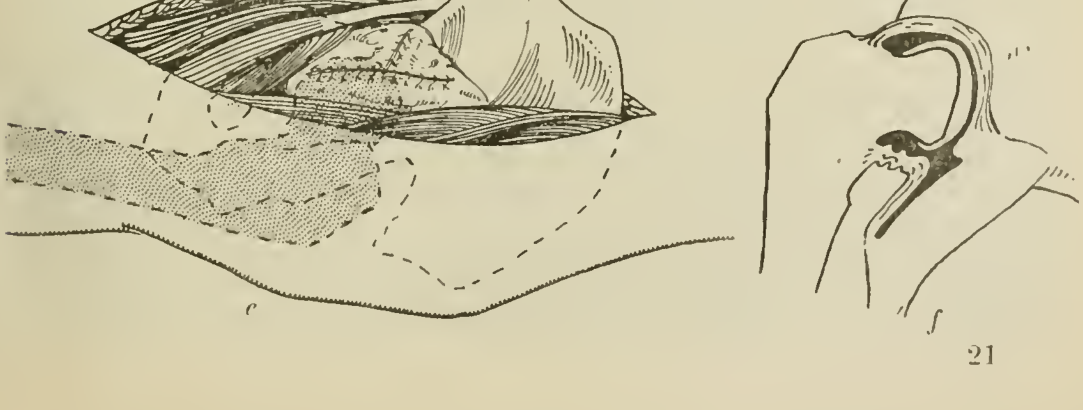


Fig. 62.—Open operation for congenital dislocation of hip. (*A*) Acetabulum; (*BB*) Line of incision; (*A.S.I S*) Anterior superior iliac spine; (*S*) Sartorius; (*R.F.*) Rectus femoris; (*T.F.F.*) Tensor fasciæ femoris; (*C*) Capsule; (*F*) Femur; (*M*) Lever.

(*a*) Outline drawing showing incision. (*b*) Exposure of the head of femur after separating muscles from spine and crest of ilium. (*c*) Division of capsule: demonstration of constriction. (*d*) Levering head of femur back into acetabulum. (*e*) Closure of capsule. (*f*) Diagram showing the constriction of the capsule which is the main hindrance to reduction of congenital dislocation. (*After Calot. Redrawn from ‘La Presse médicale’.*)

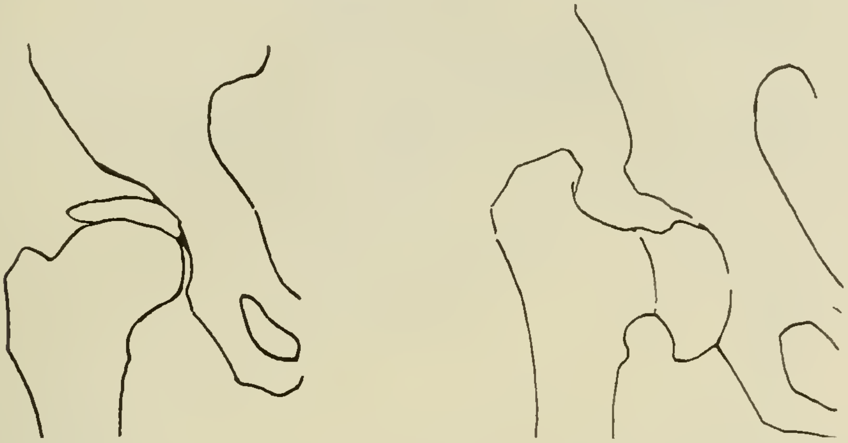


paper has given a salutary shock to the orthopædic world, and inquiries are now being made both in America and this country as to the after-histories of the many cases of 'bloodless reduction'; it is already quite clear that this method is uncertain in its immediate and lasting results, and as commonly practised is associated with frequent severe accidents, such as fracture of the neck of the femur.

French surgeons have apparently had the largest series of successful cases of manipulative reduction, and it will be very long before their belief in the method is shaken. But we note that the comparative simplicity which characterized the method when it was first popularized by Lorenz has now given place to a most bewildering complexity. Thus Calot[15] discusses various errors and causes of failure which arise from a misinterpretation of radiograms or from not adapting the exact manipulation and position of retention to the particular malformation of the hip which is present in each case. Apart from extreme partizans of one method or another, the common-sense view would appear to be as follows. Every case up to the age of 6 years should be manipulated under an anæsthetic. A large proportion of cases between 2 and 4 can be reduced quite easily. In no case should violence be used—e.g., tearing the origin of the adductors, or manipulations which fracture the femur. In all cases when simple manipulation fails to reduce, or where relapses occur, then open operation should be proceeded with at once (*Figs.* 62 *a* to *f*) .An incision is made along the outer lip of the crest of the ilium for three inches behind the spine and continued vertically downwards for the same distance. All muscles arising from the anterior superior spine, crest, and outer surfaces of the ilium within the limits of this incision are scraped off, and the head of the bone and the capsule exposed between the tensor fasciæ femoris and the sartorius. The capsule is opened and is found to be constricted at one point to a very narrow neck, through which it is quite impossible to pass the femoral head. After division of the capsule, the head is levered into position by a kind of shoehorn. If it does not readily remain in position, then the cavity of the acetabulum must be enlarged by suitable gouging. The capsule is sewn together after the final re-position of the joint, and the limb is placed in plaster in the position which gives it greatest security. This is usually moderate abduction with slight eversion.

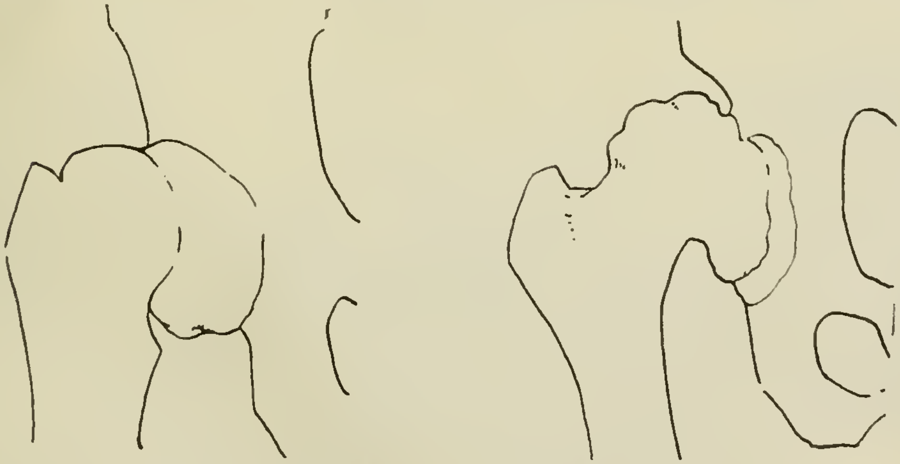
Pseudo-Coxalgia—This subject continues to occupy a large number of writers—Calvé,[16] Roderick,[17] Sundt,[18] Levy,[19] Weil,[20] Fromme,[21] Fairbank;[22] but still the boundary definition between the various affections of the hip-joint in children is far from clear (*Fig.* 63 *a* to *d*). It is more than ten years now since this condition was described by Legg in America, Calvé in France, and Perthes in Germany, and unfortunately the condition is generally known by one of two unsatisfactory names, the Legg-Calvé-Perthes disease, or pseudo-coxalgia. The latter term is intended to indicate that it is a spurious form of tuberculous hip; but inasmuch as it is conspicuously painless, the name is a bad one, and we would welcome the suggestion made by Calvé[16] to adopt the simple name 'coxa plana', which is derived from the flattened appearance assumed by the head and neck of the femur. Perhaps the most definite characteristic of the condition is the striking disproportion between the *x*-ray picture and the clinical signs. The head and neck of the femur are more obviously abnormal than is usually the case in the early stages of tuberculous disease, and yet the child has no pain, the hip can be fully flexed or extended, and nothing but a painless limp serves to indicate any abnormality. Eighty per cent of the cases are boys, and the disease manifests itself between the ages of 3 and 12. It produces some limitation in the power of abduction, but otherwise causes no disability. There is no evidence of inflammation, neither is an abscess ever developed. The cases always undergo spontaneous recovery, with more or less deformity of the neck of the femur, which is ultimately somewhat of a varoid type.

That this type of disease is certainly not tuberculous is accepted by all, and from a practical point of view it is a matter of some importance to recognize this fact, lest children should be condemned to an entirely unnecessary splinting and sanatorium treatment. The subject with which literature now concerns itself most is the nature and origin of the condition. It is said that injury takes part in over 50 per cent of the cases, but it may be questioned whether any child between the ages of 3 and 12 is ever free from the falls incidental to that period of life. If the evidence for trauma is slight, the evidence of all other causative agents is still less. A subacute rheumatic infection, rickets, late rickets, congenital subluxation, and a disturbance of endocrine activity have all been invoked to explain the matter. Not only is the origin uncertain, but the distinction between it and other conditions, such as slipping of the epiphysis and juvenile coxa vara, is not very clear.



(*a*) Pseudo-coxalgia, showing small flat epiphysis of the head and the short thick neck of the femur. (*After Whitman.*)

(*b*) Coxa vara. Child, 8 years old; general bending of the neck of the femur, with little deformity at the epiphyseal line. (*After Albee.*)



(*c*) Traumatic separation of the epiphysis, (*After Albee.*)

(*d*) Osteo-arthritis of the hip-joint; wandering acetabulum. (*After Albee.*)

Fig. 63.—Types of hip deformity in children compared with pseudo-coxalgia.

Ununited Fractures of the Neck of the Femur.—Fracture of the neck of the femur is exceedingly liable to be followed by non-union. This is due probably to want of firm apposition between the fragments, and also to an interposition of fascia. No doubt this non-union can be prevented by timely abduction of the leg fixed by a firm plaster. But when such a case is seen three, six or nine months after the accident, then there is so much atrophy of the neck that union is impossible, and even if it could be brought about by a bone peg, there is so much distortion and shortening that it would not be worth while. These cases of non-union are, however, painful, and the condition is one which demands some adequate treatment. Whitman,[23] who has done so much for the surgery of this injury in its recent phase, is now most helpful in suggesting a simple method of treatment for the late phases (*Figs.* 64, 65, 66). This

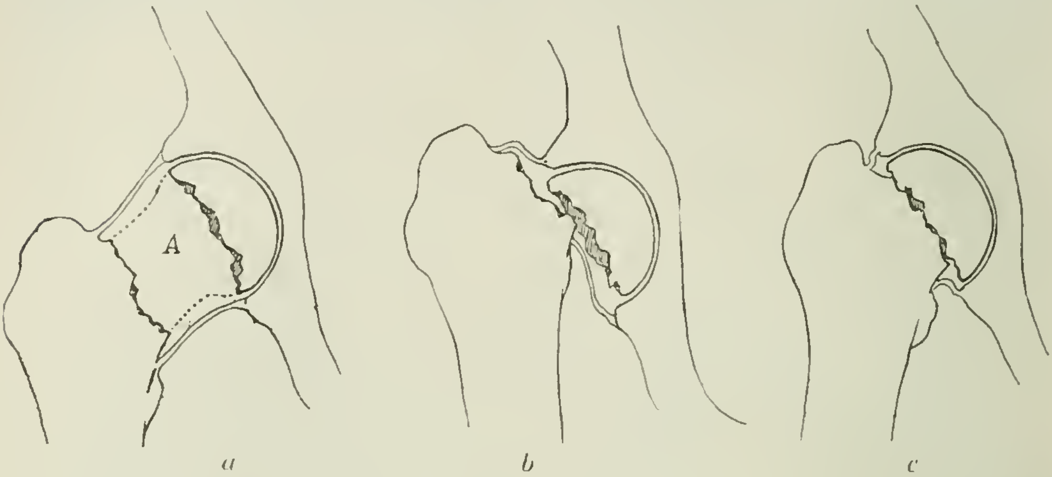


Fig. 64.—Whitman's method of reconstruction of such a femur. (*a*) The area of the neck that is usually 'absorbed' in ununited fractures of long standing (*A*). (*b*). The relation of the fragments in the ordinary type of ununited fracture. The shaft of the femur is displaced upward and adducted. (*c*) The fragments are apposed for direct repair, illustrating contact of the trochanter with the rim of the acetabulum, which checks abduction of the limb and causes functional disability, even when union is attained.

(*Figs.* 64, 65, 66 *re-drawn from 'Surgery, Gynecology, and Obstetrics'.*)

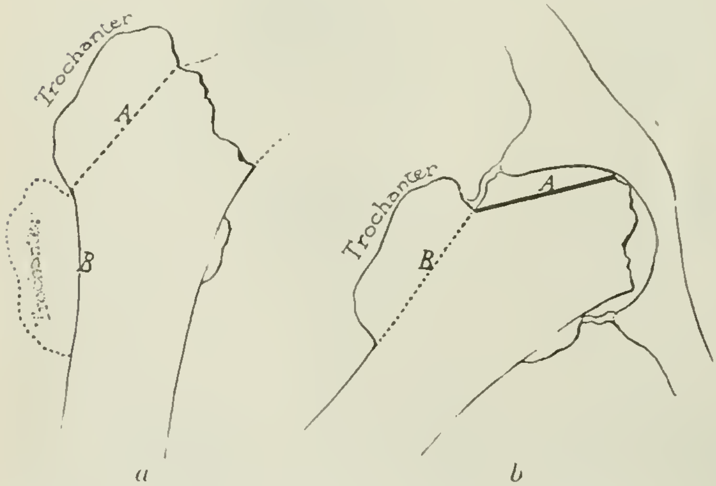


Fig. 65.—The reconstruction operation. (*a*) The line of section of the trochanter, and the point on the shaft to which it is to be transferred. (*b*) The reconstructed neck.

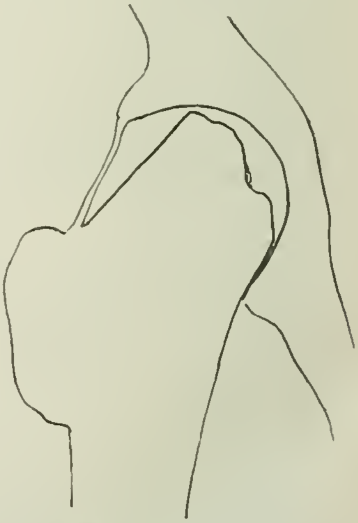


Fig. 66.—The relation of the reconstructed neck to the acetabulum in locomotion, and the leverage assured for the abductors.

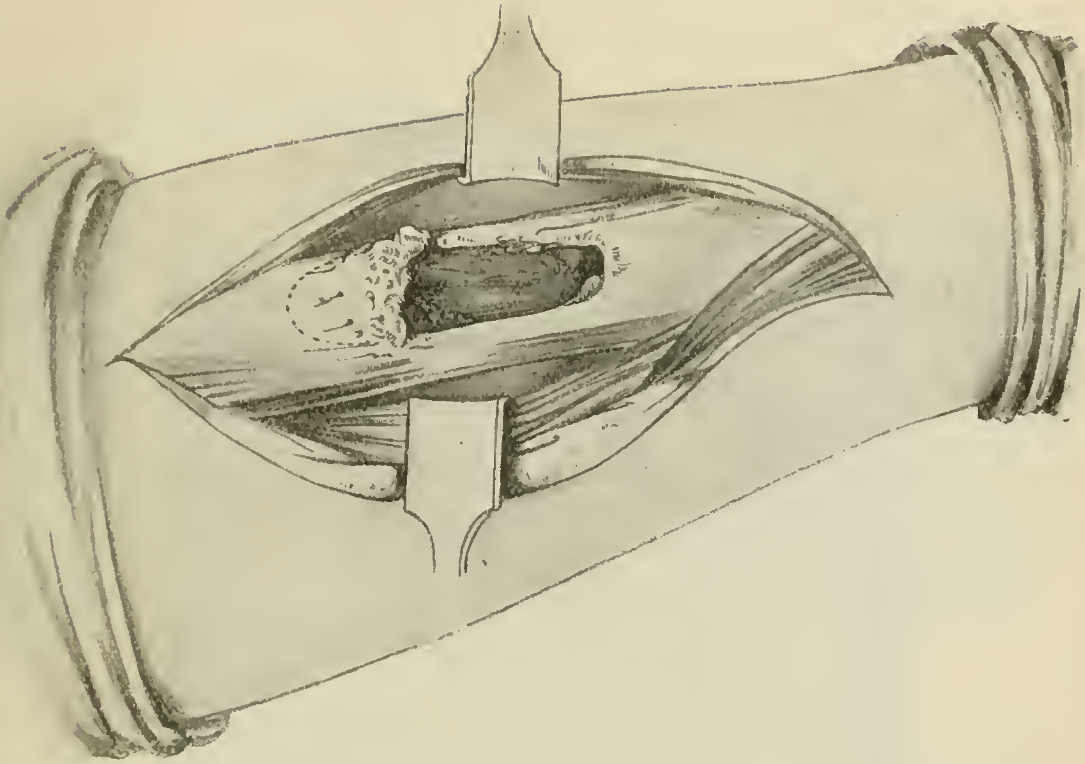


Fig. 67.—Gutter type of cavity in femur. Dotted line shows the amount of bone requiring removal.

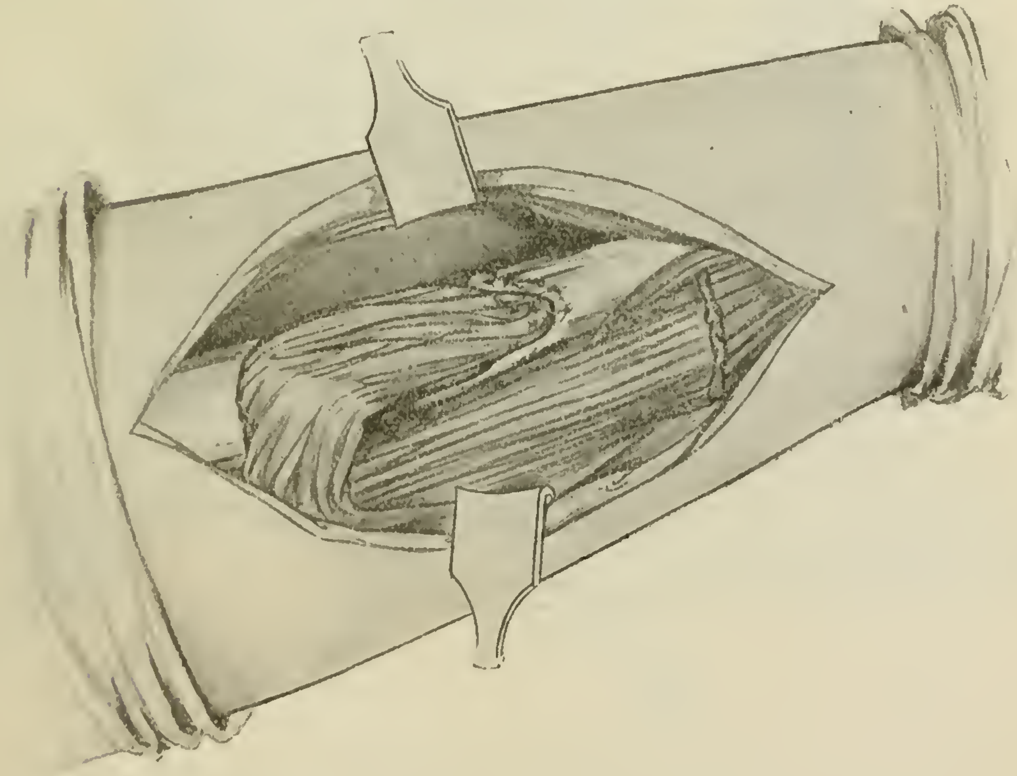


Fig. 68.—Cavity filled by single flap from vastus externus, with its base above.

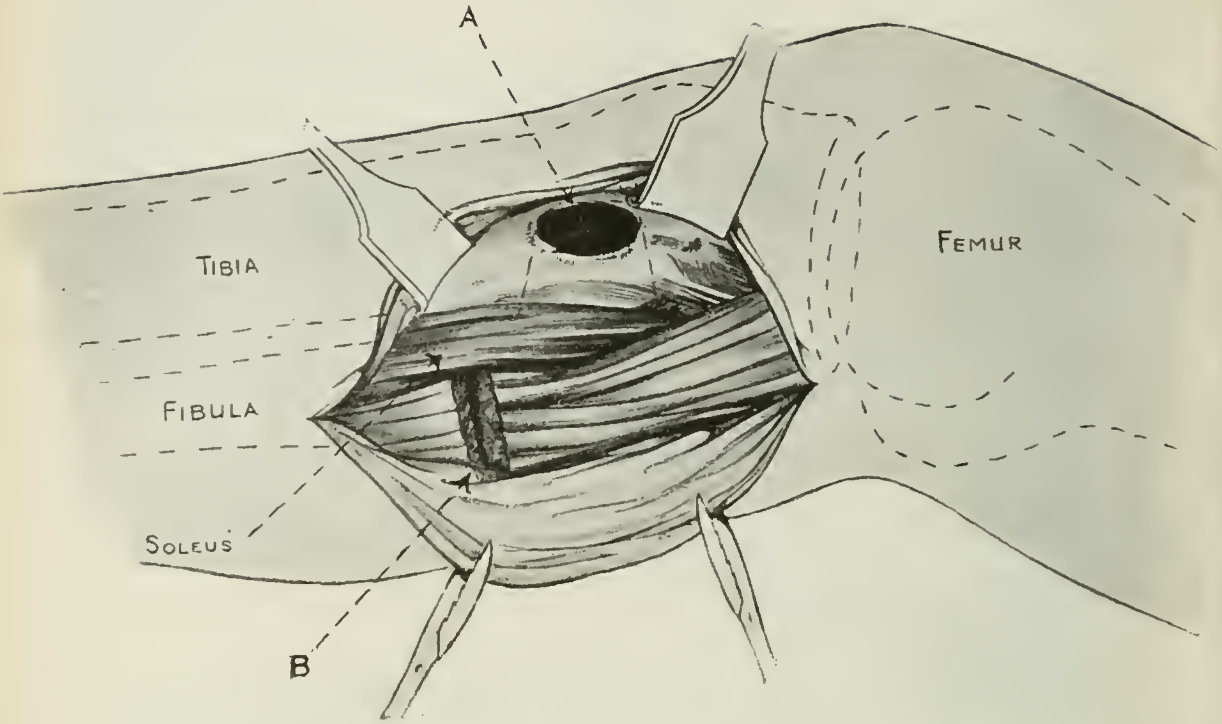


Fig. 69.—A, Cavity on inner side of head of tibia. B, Flap from inner head of gastrocnemius.

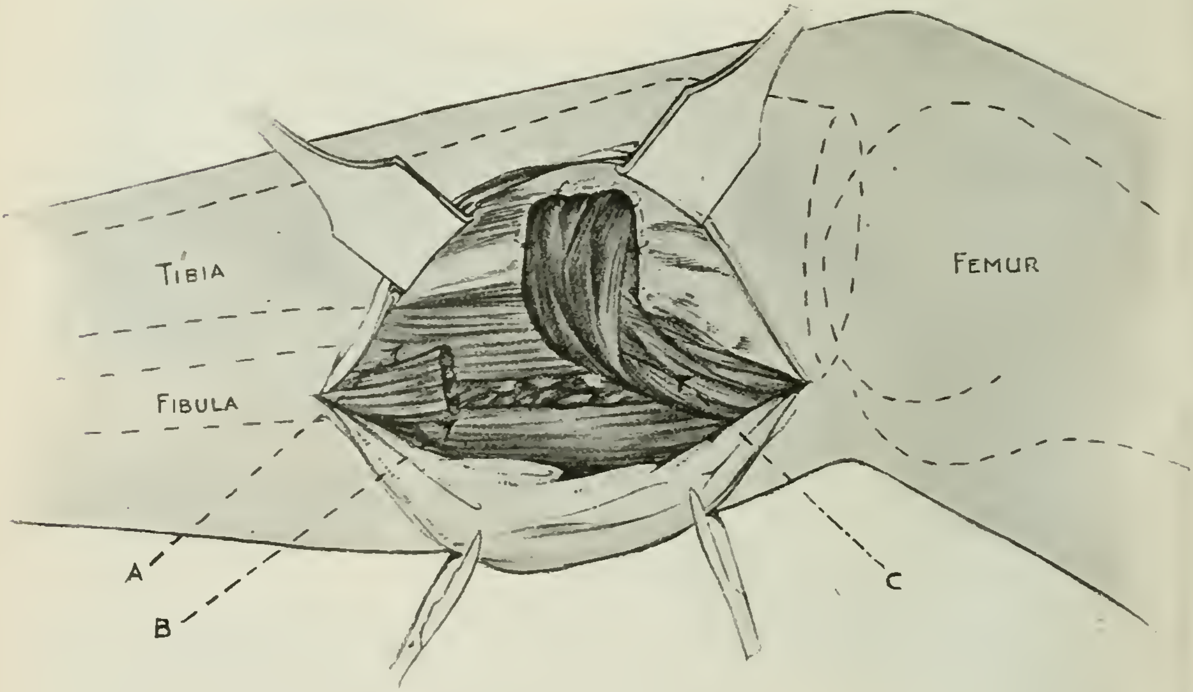
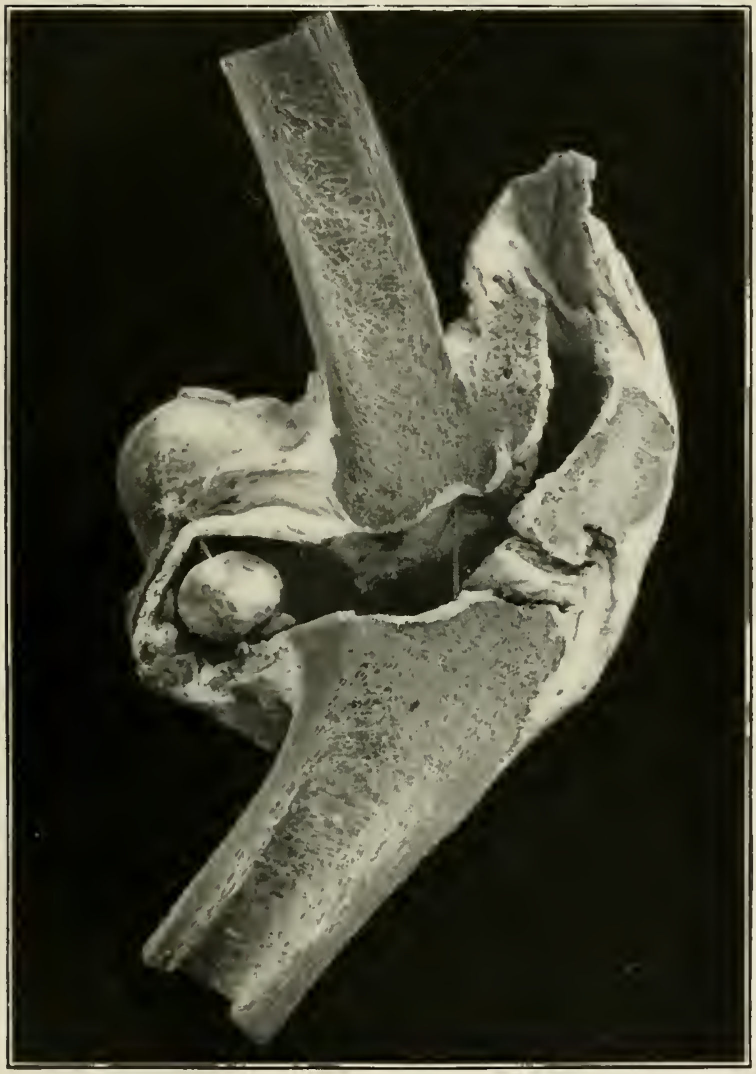


Fig. 70.—A, Soleus muscle. B, Gastrocnemius. C, Flap from gastrocnemius inserted into cavity.

PLATE XXV.

LOOSE BODIES IN JOINTS



Tabetic knee-joint in vertical section.

Plates XXV–XXVIII by permission of the 'British Journal of Surgery.'

PLATE XXVI.

LOOSE BODIES IN JOINTS

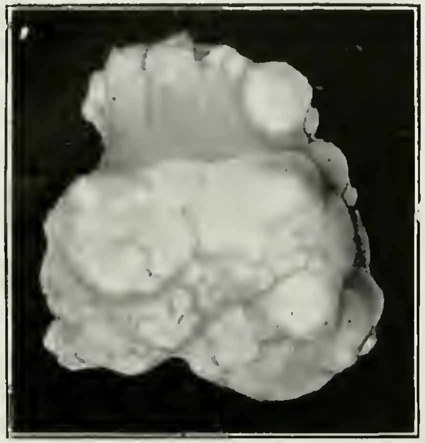


Fig. A. Detached osteophyte. (× 2.)

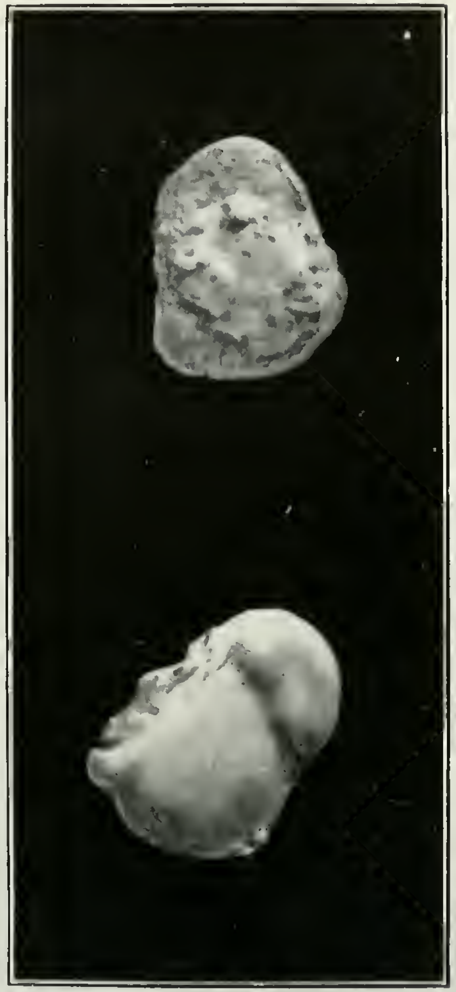


Fig. B.—'Classical' form: both aspects.

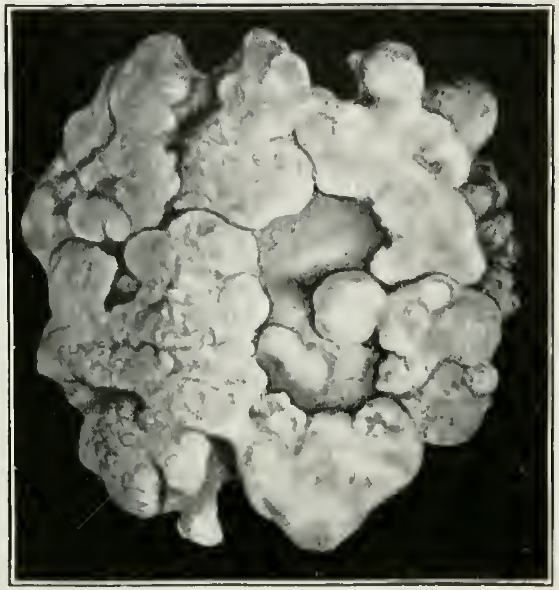
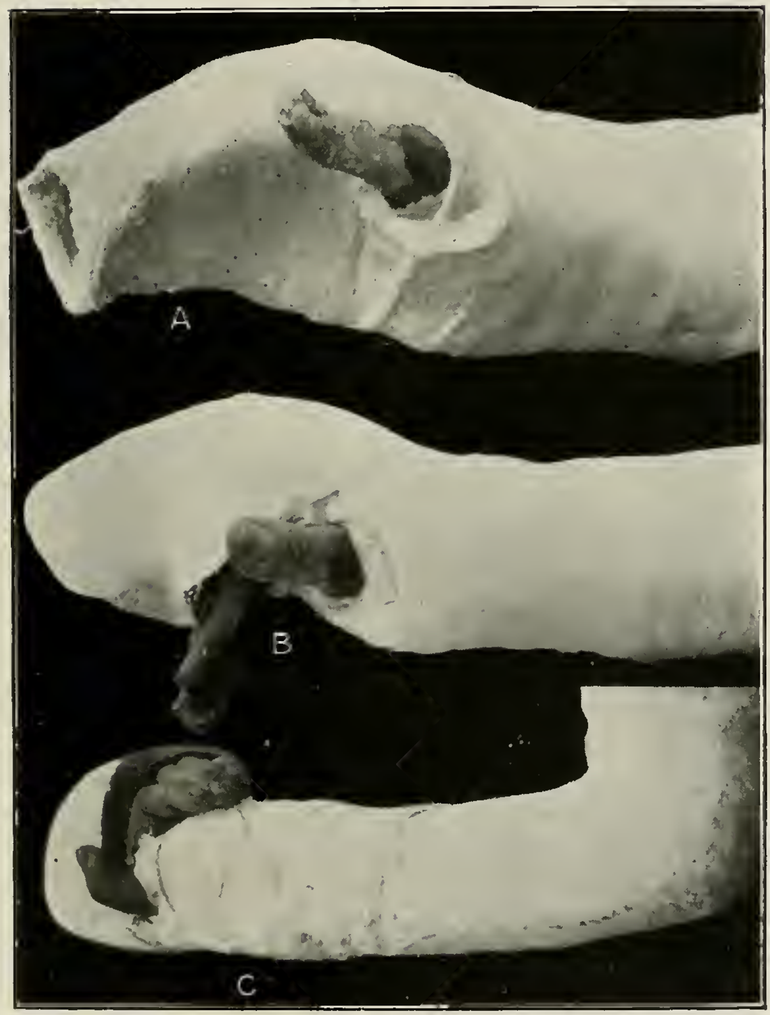


Fig. C. Loose bodies exhibiting marked degree of hyperplasia. (*Natural size.*)

TREATMENT OF STIFF FINGER-JOINTS



(A) Plaster case applied; **(B)** Case with the anterior portion cut away to allow flexion of fingers; **(C)** Fingers in full flexion.

PLATE XXVIII.

TREATMENT OF STIFF FINGER-JOINTS—*continued*

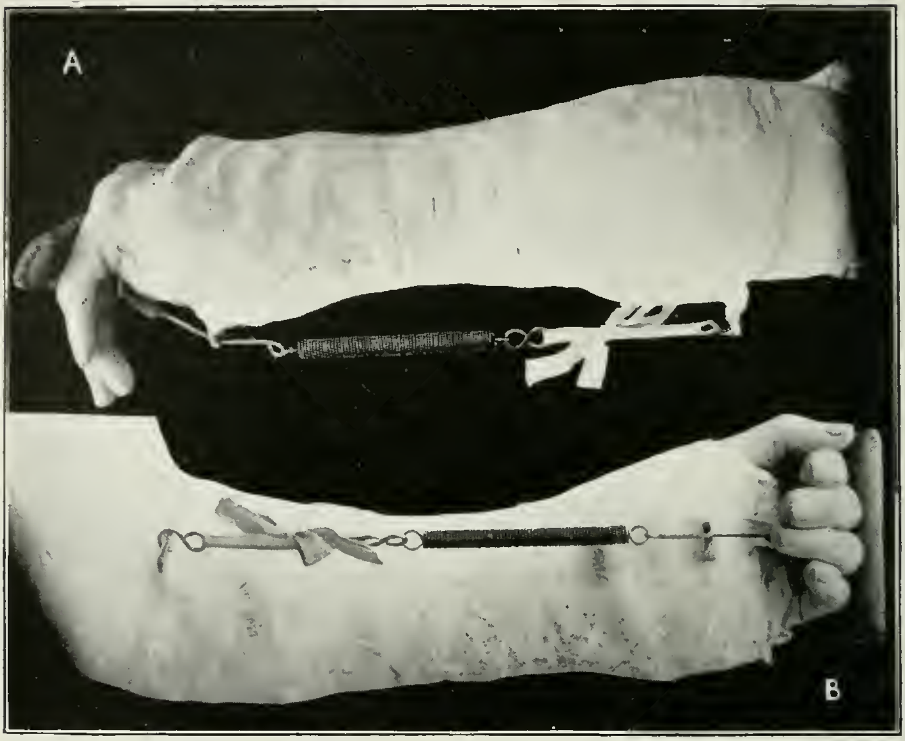


Fig. A.—Padded bar and metal spring in position, maintaining the flexion of metacarpo-phalangeal joints.

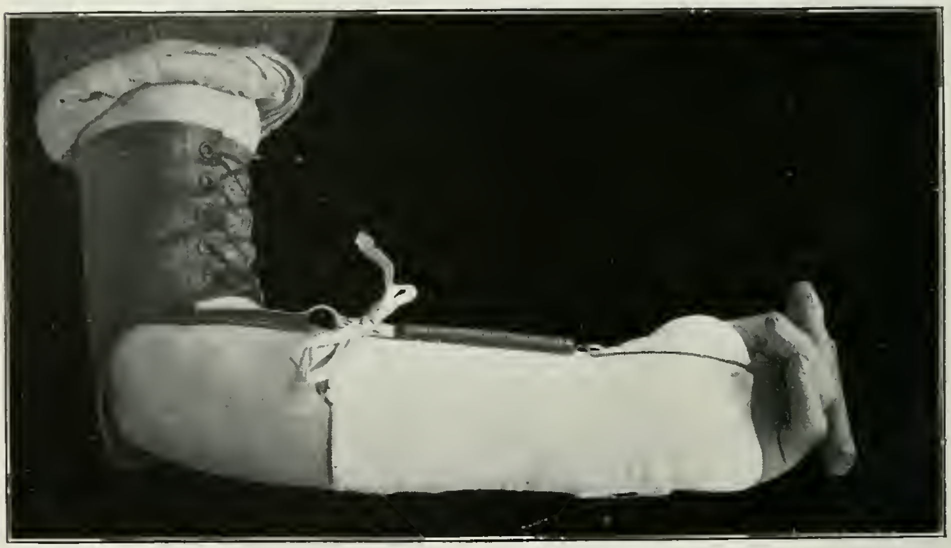


Fig. B. The plaster case has been replaced by a short cock-up and a spring leather elbow-case, allowing of elbow movements.

consists in removing the head of the femur, in chiselling off the great trochanter, and then shaping the neck of the bone so as to fit into the acetabulum. The trochanter is fixed to the shaft of the bone below its original position.

Loose Bodies in Joints.—A careful study of these structures with reference to their pathology and etiology has been made by Fisher,[24] who makes a useful classification of them according to their origin. He divides them as follows :—

Group 1.—Loose bodies occurring in connection with some more or less pathological disease of the joint, such as osteo-arthritis of tabes (*Plates XXV, XXVI, A.*)

Group 2.—Loose bodies occurring in joints which are otherwise apparently normal (*Plate XXVI, B*).

Group 3.—Synovial chondromata (*PlateXXVI, C*).

His researches lead the author to the conclusion that the great majority of cartilaginous loose bodies in the joints are composed of living tissue ; that many of them undergo considerable growth after they have become detached ; and that when they are derived from portions of the articular cartilage their origin is due to injury and not to necrosis.

Septic Bone Cavities.—After various methods for closing septic bone cavities have been suggested and tried, there is no doubt that the using of pedicled muscle flaps is by far the most satisfactory. Two other methods which have had a great vogue have been those of Broca, in which the cavity is merely flattened out by removal of three of its boundary walls, and that of filling the cavities with various aseptic wax, bone, or sponge substances. Broca's method is still the best for situations such as the lower end of the tibia where there is no fleshy muscle to fill the cavity. But all the aseptic plugging methods are inferior to the muscle flap: first, because of the difficulty of sterilizing a large cavity in hard bone ; and second, because, after initial success, failure may often occur at a late period from recrudescence of sepsis. Wood,[25] in a well-illustrated article, describes 24 cases of septic cavities in bones filled by muscle flaps—with complete success in 21 (*Figs.* 67, 68, 69, 70). The only counter-indications to the method are active inflammation or cellulitis or excessive muscle wasting. The average term of healing was forty days.

Stiff Finger-joints.—There are many cases where, without any gross bony change in the knuckle-joints, the latter become stiff, painful, and useless after nerve injury or inflammatory affection of the hand. The fixation of the joints makes the hand almost useless, and it defies simple massage or movement under anæsthesia. Steady flexion combined with traction will often effect great improvement, and this method has been used with much success by Dickson[26] (*Plates XXVII, XXVIII*). First he puts the elbow, forearm, and hand into plaster, the wrist being dorsiflexed and the hand supinated. The plaster in front of the fingers is cut away, and felt wedges are put behind the first phalanges so as to flex the metacarpophalangeal joints. In the next stage a padded metal bar is placed at the back of the fingers and tied to a hook in the plaster case by means of a steel wire spring. Finally, a leather arm-splint with a spring to maintain finger flexion is provided, the hand being kept in dorsiflexion by a cock-up splint.

REFERENCES.—[1]*Brit. Med. Jour.* 1920, ii, 773, and 1921, i, 181 ; [2]*Lancet*, 1921, i, 73 ; [3]*Ibid.* 1065 ; [4]*Ibid.* 1071 ; [5]*Münch. med. Woch.* 1920, ii, 1145 ; [6]*Brit. Med. Jour.* 1921, i, 587, 636 ; [7]*Surg. Gynecol. and Obst.* 1921, i, 20 ; [8]*Jour. of Orthop. Surg.* 1920, ii, 255 ; [9]*Arch. f. klin. Chir.* 1914, civ, No. 1 ; [10]*Dublin Jour. Med. Sci.* April, 1920. 161 ; [11]*S. Afric. Med. Record*, 1921, Jan., 27 ; [12]*Jour. Amer. Med. Assoc.* 1921, April, 925 ; [13]*Surg. Gynecol. and Obst.* 1921, April, 291 ; [14]*Jour. of Orthop. Surg.* 1920, ii, 390 ; [15]*Presse méd.* 1920, Sept., 666 ; [16]*Ibid.* 1921, May, 383 ; [17]*Lancet*, 1921, i, 210 ; [18]*Ibid.* 1153 ; [19]*Centralb. f. Chir.* 1920, Oct., 1338 ; [20]*Ibid.* 1921, April, 517 ; [21]*Ibid.* Feb., 154 ; [22]*Lancet*, 1921, i, 20 ; [23]*Surg. Gynecol. and Obst.* 1921, June, 479 ; [24]*Brit. Jour. Surg.* 1921, April, 193 ; [25]*Ibid.* 460 ; [26]*Ibid.* Jan., 272.

OSTEOMALACIA. *Herbert French, M.D., F.R.C.P.*

Hutchison and Patel[1] give the results of their investigations into the etiology of osteomalacia in Bombay, where the disease is not uncommon. They review all the possible causes, such as housing and environment, age, diet, lactation, early marriage; but come to the conclusion that the purdah system is by far the most potent factor in the production of the disease. Analyzing the figures of abnormal labours due to osteomalacia, they find that in Mohammedan women these occur in 5·6 per cent of the labours, in Hindu women 1·04 per cent, and in 3372 labours of women of other castes none at all. The purdah system with its attendant evils prevails almost exclusively amongst the Mohammedans, while the other possible causes all exist to a more or less similar extent among all castes. There is no evidence of dietetic deficiency as a cause, for the disease occurs among the wealthier classes, while a deficiency of animal fat in the diet is common to all. They point to the more or less sudden onset, associated with fever in many cases, and the rapid softening of the bones, as evidence of a possible infective origin.

Reference.—[1]*Glasgow Med. Jour.* 1921, April, 241.

OTITIS MEDIA. (*See* Ear, Middle, Disease of.)

OVARIAN HEADACHES. *W. E. Fothergill, M.D.*

G. K. Abbott[1] describes a type of headache which he calls 'ovarian' in order to distinguish it. These headaches always occur with some definite time relation to the menses. The pain may be during the period only. It may begin a few hours or even a week before the period. In some cases it always comes after the close of the menstrual flow. An intermenstrual headache occurs in some patients with quite definite regularity, and in others it is both menstrual and intermenstrual. A striking feature is that these headaches never occur during pregnancy, they become worse as the patient approaches the menopause, and they disappear altogether as soon as the ovarian atrophy of the climacteric is complete, after surgical menopause, or after *x*-ray menopause.

The author has treated about twenty-five of these cases successfully by **Corpus Luteum** therapy, giving as much as 5 gr. thrice daily for two or three months at a time. In some cases cure was secured by a single course of treatment. In others repeated administrations were required, while some patients found it desirable to take corpus luteum for a certain portion of each menstrual cycle. The author gives several interesting cases in detail, and has made a useful contribution to our knowledge of corpus luteum therapeutics.

Reference.—[1]*N. Y. Med. Jour.* 1920, Nov., 724.

OXYURIS VERMICULARIS. *Herbert French, M.D., F.R.C.P.*

Loeper,[1] when giving bismuth to gastric patients, discovered that they were freed of threadworms by the bismuth. He now gives adults 10 grm. **Bismuth Carbonate** on two successive days; children of seven, 4 grm.; and under seven, only 2 to 3 grm.

Barrio[2] has adopted this treatment with successful results. He orders a strict milk diet for one week beforehand, and afterwards prescribes 5 grm. bismuth carbonate in a glass of water morning and evening for three days, followed by a calomel purge. The course may have to be repeated after a month's interval.

References.—[1]*Progrès méd.* 1920, Aug. 7; [2]*Arch. Españ. de Pediatria*, 1921, Jan.

PANCREAS, DIAGNOSIS OF DISEASE OF. *Robert Hutchison, M.D., F.R.C.P.*

This subject was dealt with at some length in last year's Annual, but it may be of interest to give the conclusions of Mackenzie Wallis,[1] based on his experience of the use of the laboratory tests in a large number of cases. They are as follows:—

1. There is no one test so far devised which can be said to be pathognomonic of pancreatic insufficiency.

2. The association of positive results in three tests, the increased diastase content of the urine, the Loewi adrenalin mydriasis test, and the presence of glycosuria, affords strong evidence that the pancreas is at fault.

3. If there is in addition creatorrhœa and steatorrhœa, the suspicion of pancreatic insufficiency is confirmed.

4. The transitory character of the phenomena which give positive results of diagnostic value must never be lost sight of when summarizing the evidence obtained from laboratory methods, and applying them to confirm or disprove the clinical diagnosis.

5. The results of an investigation of cases of diabetes mellitus have been negative, in that the tests have not supplied any evidence of gross disturbance of pancreatic function in this disease.

6. A review of the recorded cases reveals the fact that certain tests in their present form are of no value in the diagnosis of pancreatic disease, and should therefore be discarded. This applies more particularly to the methods of estimation of trypsin and diastase in the oil-test meal and fæces, the Sahli test, Kashiwado's modification of Schmidt's test, and the Cammidge 'pancreatic' reaction.

To this list may be added the 'sajodin' test of Winternitz in view of its doubtful utility.

REFERENCE.—[1]*Quart. Jour. of Med.* 1920, Oct., 57.

PANCREAS FUNCTION TESTS.

O. C. Gruner, M.D.

Garrod[1] classifies the signs of disease of the pancreas into:—

1. The clinical signs and symptoms: pain, tenderness, vomiting, cyanosis. signs of pressure on neighbouring structures, tumour.
2. Signs of failure of external secretion: defective digestion of proteins. fats, and carbohydrates.
3. Signs of failure of internal secretion: especially glycoesuria.

REFERENCES.—[1]*Brit. Med. Jour.* 1920, i, 459.

PANCREAS, SURGERY OF.

E. Wyllys Andrews, A.M., M.D., F.A.C.S.

Cysts.—A series of 41 cases of cysts of the pancreas is reported by Judd.[1] Only 2 of these were malignant. Most of the others were simple, due to the scar-tissue formation in chronic pancreatitis, or were hæmorrhagic. Of the 41 cases, 38 were diagnosed before operation. The symptoms are usually due only to pressure on the adjacent organs. A fluctuating mass in the epigastrium is often present as the only sign. If it is in the body it is fixed, but cysts of the tail may be movable. As the cyst enlarges it usually presents between the stomach and the transverse colon. Pain and vomiting occurred only in those cases apparently due to pancreatitis. In 6 cases diabetes was present.

In 31 cases the cyst was opened and sewn to the anterior abdominal wall. This may be the only manœuvre possible. It is not altogether satisfactory, as the drainage is prolonged and debilitating, and in some cases too early closure may necessitate a second operation. In 3 cases it was found possible to remove the lining of the cyst, and in 5 to make a complete extirpation. There was no mortality in the entire series.

Steindl and Mandl[2] report 7 more cases of cyst of the pancreas. None of theirs had diabetes or fatty stools. For the fistulas which persist for so long after marsupialization they recommend a carbohydrate-free diet and the liberal administration of alkali. It is pointed out that surgery in these conditions does not remove the underlying cause of the cysts, pancreatitis, and that this is the reason why many of the patients do not make a complete recovery.

An unusual case reported by Chand[3] shows that under certain conditions a very small amount of pancreatic tissue is sufficient to support life. A child of 2 was operated on for a large cystic tumour in the abdomen. This was found to be a cyst of the pancreas, and it involved so much of the organ, and what little remained was so intimately associated with the tumour, that the entire pancreas was removed with the cyst. Pathological examination of the tumour showed that in one place a cut surface of pancreatic tissue was present, so a little must have been left in. The child made a perfect recovery, and a year after the operation, in spite of a diet largely of carbohydrates, showed no glycosuria.

REFERENCES.—[1]*Minnesota Med.* 1921, iv, 75; [2]*Deut. Zeits. f. Chir.* 1920, clvi, 285; [3]*Ind. Med. Gaz.* 1921, lvi, 6.

PARALYSIS, INFANTILE. (*See* INFANTILE PARALYSIS.)

PARALYSIS, OCULAR. (*See* EYE AFFECTIONS.)

PARATYPHOID FEVER. (*See also* TYPHOID FEVER.)

J. D. Rolleston, M.D.

EPIDEMIOLOGY.—In his article on enteric fevers in the British Expeditionary Force, 1914–18, Sir William Leishman[1] states that the first cases of paratyphoid fever appeared very soon after the first typhoids, but continued rare and isolated until 1915 was well advanced. Later, on the transfer of the British lines to Flanders, paratyphoids became more frequent, doubtless owing to the prevalence of these fevers in addition to genuine typhoid among the Flemish and French refugees in the villages around Ypres and Armentières. By degrees the number of cases of paratyphoid under treatment came to exceed those of typhoid, and from the month of June till the end of 1918 paratyphoids retained this preponderance. Both forms were represented, but paratyphoid A was always rarer than paratyphoid B, the British experience in this being the reverse of the French.

According to J. R. Harper,[2] the case mortality of paratyphoid in the British Expeditionary Force in France was only 1·28 per cent, that of paratyphoid A being even lower.

SYMPTOMS.—V. Zamorani,[3] who had the opportunity of observing 130 cases of paratyphoid A fever during the war, states that affected soldiers had been mostly inoculated against typhoid and paratyphoid B, and some had not been inoculated at all. None had been vaccinated against paratyphoid A. In most of the cases the disease ran a mild course without any intestinal complications, death in the fatal cases being due to pulmonary complications. A clinical distinction from typhoid fever was impossible. Paratyphoid B, in Zamorani's experience, was a much more serious disease. Intestinal hæmorrhage in particular was more frequent, and in four cases perforation occurred.

E. Lesné, H. Violle, and J. Langle[1] report an outbreak of 28 cases of paratyphoid B in the month of June due to eating cream tarts. The disease was characterized by a short incubation period (ten to eighteen hours), sudden onset of gastro-enteritis, and rapid improvement. Although the patients were not strictly isolated, no case of contagion occurred. The tarts had been on the shop counter exposed to the sun for more than twenty-four hours, but had no unpleasant smell or taste.

Rocher[5] records the case of a girl, age 13, who had a severe attack of paratyphoid, the variety of which is not specified, at the age of 8, for which she was confined to bed for eighteen months. At the seventh month *dislocation of the right hip-joint* was observed, without any symptoms of acute suppurative arthritis. At the present time there were 6·5 cm. shortening, adduction of 45°, and slight internal rotation. There was slight lumbar lordosis, and coxofemoral flexion was almost complete. *X* rays showed slight deformity of the head of the femur due to rarefying subcortical osteitis, general atrophy of the extremity of the femur, and disappearance of the rim of the acetabulum.

According to H. Mallié,[6] who records an illustrative case in paratyphoid B, *pleurisy* is less frequent in paratyphoid than in typhoid fever. The complication may occur in the course of the disease or in convalescence. In Mallié's case it developed in the third week, or earlier than in any of the other cases on record. Although dry pleurisy has been reported by Bourges, in the great majority of cases there is an effusion, which is usually serous. It is scanty in amount, and very rarely requires paracentesis. It may be insidious in its onset and escapes notice for a long time. Although the effusion is usually serous, it may subsequently become purulent or be purulent from the first. No instances of hæmorrhagic pleurisy have been recorded in paratyphoid, though this form is frequent in typhoid. Bacteriological examination shows *B. paratyphosus A* or *B* either alone or associated with the pneumococcus.

G. Herrnheiser[7] reports 157 cases of paratyphoid *bacteriuria*, 72 of which were due to paratyphoid A and 85 to paratyphoid B. The onset of the excretion of bacilli began as a rule in the second to fourth week, but might be delayed till the seventh week, the bacteriuria being ephemeral, continuous for weeks, months, or years, or intermittent in character.

D. Wood[8] records a case of *vesical calculus* composed of calcium oxalate in a typhoid carrier. The onset of the disease was associated with acute nephritis. Judging from agglutination results, *B. paratyphosus A* was the infecting organism. Suprapubic lithotomy was performed, and recovery took place.

M. Martens[9] reports cases of single or multiple *abscesses of the liver*, multiple renal abscesses and pulmonary abscesses due to paratyphoid B, and a case of a large abscess in the thigh due to paratyphoid A.

E. Lesné[10] relates a case of paratyphoid B complicated by *suppurative meningitis*, which was cured by lumbar puncture and intrathecal injections of collargol.

Prophylaxis.—In view of the epidemic of paratyphoid B infection caused by the consumption of cream tarts, Lesné, Violle, and Langle[4] recommend an absolute prohibition of the sale of pastry containing raw cream, at least in the summer months. Permission to sell cream tarts in other seasons should be granted provided, (1) the place where they are sold is kept very clean, (2) no animals are kept in the shop, (3) the tarts are sold within twelve hours after they have been made.

References.—[1]*Glasgow Med. Jour.* 1921, i, 81; [2]*Lancet*, 1920, ii, 1190; [3]*Policlinico* (Sez. Prat.), 1921, 747; [4]*Presse méd.* 1920, 725; [5]*Gaz. hebd. Sci. méd. de Bordeaux*, 1921, 261; [6]*Jour. de méd de Bordeaux*, 1921, 245; [7]*Med. Science*, 1920, iii, 206; [8]*Bristol Med.-Chir. Jour.* 1920, 148; [9]*Med. Science*, 1920, iii, 296; [10]*Bull. Soc. méd. Hôp. de Paris*, 1920, 1162.

PARATHYROID GLANDS. (*See* Endocrinology.)

PAROTID GLAND AND DUCT, SURGICAL AFFECTIONS OF. (*See* Mouth and Face.)

PELVIC INFECTION.

W. E. Fothergill, M.D.

Operative Treatment of Peritonitis.—J. O. Polak[1] writes on the indications for operation in spreading peritonitis after labours and abortions. He has been impressed with the complete anatomic isolation of the pelvis which generally obtains in puerperal pelvic infection when the uterus is within the confines of the pelvic brim. With proper treatment, such as the Fowler posture, an icebag over the abdomen, morphia, and enemata, the symptoms gradually subside unless the pelvic isolation of the infective process is incomplete, as it may be when the uterus extends outside the true pelvis, or the bacterial inversion is so powerful as to overcome the leucocyte and plastic reaction. In such cases, instead of the abdominal symptoms subsiding, there is increase of abdominal pain, peristalsis, tension, and distention. There is also increase or persistence of the temperature reaction and in the rapidity of the pulse-rate. But, says Polak, far more important is the increase in the polymorphonuclear percentage. This is always increased in spreading peritonitis, no matter how high the leucocytosis may be. With the above symptom-complex conservative treatment should cease, and drainage should be promptly established, either through the pouch of Douglas (*Plates XXIX, XXX*) or through a suprapubic stab wound.

Reference.—[1] *Amer. Jour. Obst. and Gynecol.* 1920, Nov., 161.

PELVIC VARICOCELE.

W. E. Fothergill, M.D.

L. A. Emge[1] has collected data from the histories of thirty-five patients who were seen during operations to have varicose veins in the broad ligaments, his object being to prove whether this condition does or does not produce symptoms which can be recognized clinically and can or cannot be diagnosed. The author points out that there are five pelvic plexuses of veins : the vaginal, vesical, uterine, and hæmorrhoidal, which drain into the inferior hypogastric vein, and the parovarian or pampiniform plexus which empties through the ovarian veins into the vena cava on the right side and into the renal vein on the left. In the entire venous structure there is only one valve, and that lies at the end of the right ovarian vein. In the ovarian circulation are two sets of veins, one above and one below the attachment of the ovary. The vessels are tortuous and numerous, and are supported by very little connective tissue and practically no muscle. For a distance of from 7 to 9 cm. the ovarian vein lies between two layers of peritoneum, with very little padding to rest upon, and in the erect posture these veins ascend vertically for two-thirds of their length. The right vein is somewhat guarded against back-flow by the intersecting valve at the vena cava, but the left enters another venous stream, the renal vein, at right angles, is without a protective valve, and is therefore open to back-flow. The author states that a patient may acquire varicose veins as a primary lesion, or that they may be secondary to other pelvic lesions, which is an important distinction from the therapeutic standpoint. He gives tables constructed from the records of the patients, showing the locality of the pain complained of, the menstrual disturbances, the pre-operative diagnosis, the operative findings, and the results of operative treatment. The usual complaint is bilateral or unilateral, generally left-sided, pain of a dull character, low down in the abdomen, which grows worse on standing and is relieved on lying down. This complaint is just as typical for women as it is for men with varicocele. The author says that if the patient is examined by the rectovaginal method in the standing posture, it is as easy to feel these veins as it is in the male subject. They are not felt when the woman is lying down. At operations they are often unseen if the Trendelenburg position is used. The author has realized that hot douching makes these

PLATE XXIX.

OPERATION IN SPREADING PERITONITIS

(POLAK)

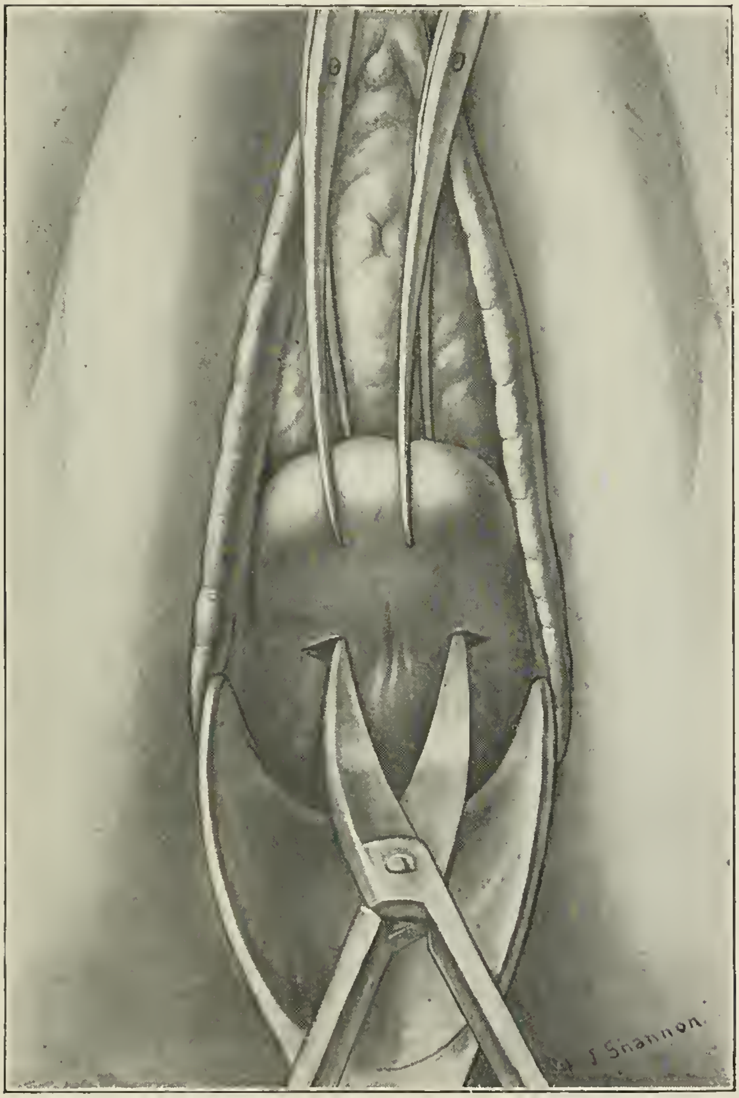


Fig. A.—Posterior vaginal section, showing incision through the vaginal wall behind the cervix.

Plates kindly lent by the 'American Journal of Obstetrics and Gynecology'

PLATE XXX.

OPERATION IN SPREADING PERITONITIS—*continued*

(POLAK)

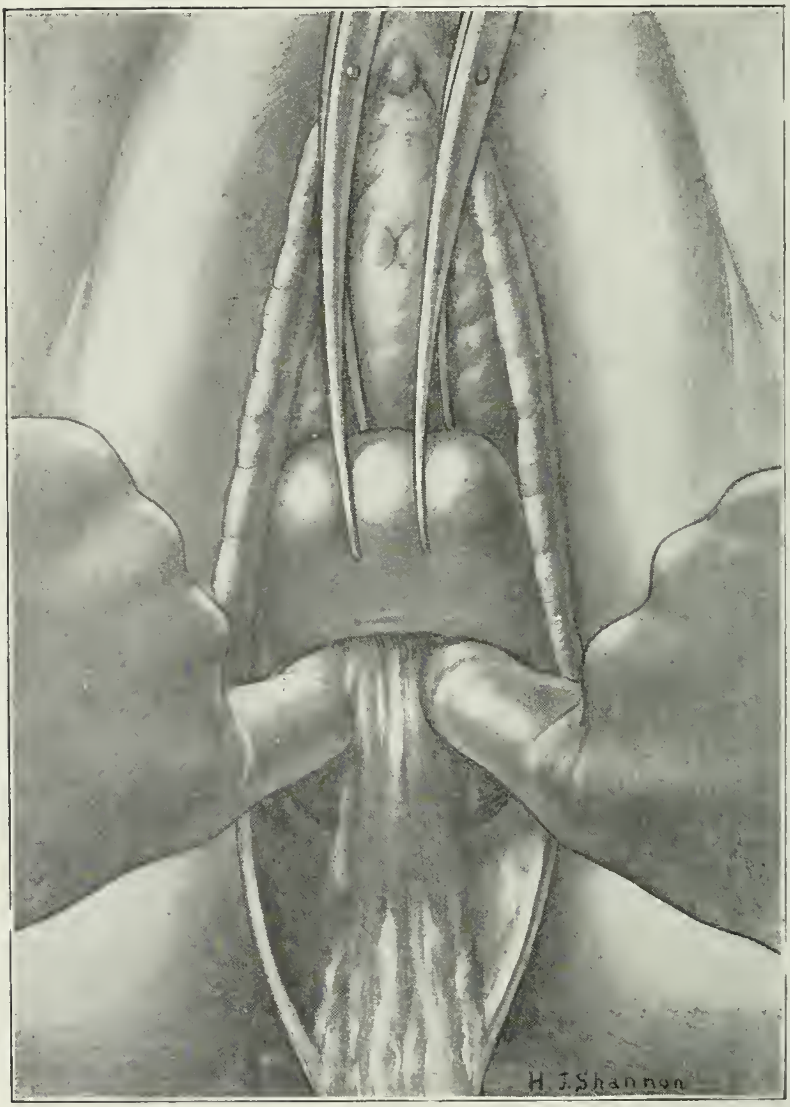


Fig. B.—Colpotomy incision widened by fingers.

patients worse. But he thinks they can be relieved by correcting uterine displacements by operative measures, such as high suspension of the uterus with shortening of the uterosacral ligaments. The author refers to the work done on this subject by Winkel in 1886, Dudley in 1889, and Miller and Kanariel in 1905; but does not give the references.

[See the MEDICAL ANNUAL for 1917, pp. 400, 401, where recent papers by J. A. Wall and W. E. Fothergill are abstracted. Emge does not seem to have realized that it is cases of secondary varicocele that can be cured by operative treatment of the primary lesion. The treatment of primary varicocele in women with no lesion other than the dilatation of their pelvic veins is hygienic rather than surgical.—W. E. F.]

REFERENCE.—[1]*Surg. Gynecol. and Obst.* 1921, Feb., 133.

PERICARDITIS, SUPPURATIVE. (*See* THORACIC SURGERY.)

PERIPHERAL NERVES. (*See* NERVES, PERIPHERAL; NEUROLOGICAL SURGERY; SCIATICA.)

PERITONITIS. (*See also* PELVIC INFECTION.)

E. Wyllys Andrews, A.M., M.D., F.A.C.S.

Our views as to the treatment of diffuse peritonitis are gradually becoming somewhat modified. The cardinal principles, of course, are to remove the focus if any exist, and to bring about complete rest—that is, absence of peristalsis. To this end complete abstention from all food and drink by mouth, the liberal administration of **Morphine**, and the administration of water and stimulants by rectum, are, of course, indicated, as is outlined by Hughes.[1] However, certain other factors are often neglected. Dubs[2] and Collins[3] both call attention to the necessity of **Drainage of the Intestine** in all severe cases. The paralytic ileus resulting in all cases of general peritonitis is the real cause of death, and not the actual sepsis. The toxins absorbed from the stagnating material in the small intestine, and especially the upper part, are nearly always the actual cause of death. If the disease has progressed so far that the intestine is no longer capable of expelling this matter, death is bound to ensue unless the body is relieved of the burden by an enterostomy. This much is known from animal experiments, and the surgeons who have had the courage to apply the knowledge have been rewarded by many cures in apparently hopeless cases. The vomiting is at once relieved, and with the discharge of the toxic duodenal contents a great improvement in the general condition is at once noted. The getting rid of the gaseous distention thus accomplished is also a factor.

Actual drainage of the peritoneum is of doubtful value, and in fact may not be possible. In the opinion of many surgeons, a drain left in the free peritoneum is immediately walled off, and any discharge from the wound comes only from the immediate neighbourhood of the tube. The danger of fistula formation from a drain causing an ulceration through a diseased bowel wall is so great that much hesitation should be shown before such a dangerous procedure is adopted.

Neudorfer[4] reports 22 cases of general peritonitis treated by pouring **Ether** into the free peritoneum. The results were excellent, only 5 of the series dying. In previous years 42 similar cases were found with 19 fatalities. Of the 5 fatal cases 3 were late (three weeks)—2 from secondary abscesses in other regions and 1 from pneumonia; only 1 case died directly from the peritonitis. In these cases the wounds were all closed without drainage for the reasons given above.

Gal[5] reports an extensive set of experiments to prove the value of **Vaccines** in peritonitis. Animals were injected with *B. coli* vaccine, and later infected directly into the peritoneum by injections of cultures of bacteria. The immunity produced was marked, as one would expect, but further study revealed that it was not specific for any germ. There was no change in the opsonic index or in any other of the immunity reactions. The only apparent change was the greater degree of leucocytosis in the vaccinated animals, and the authors suppose that that accounts for the relative immunity.

References.—[1]*Jour. R.A.M.C.* 1920, xxxiv, 521; [2]*Schweiz. med. Woch.* 1921, Jan. 20, 51; [3]*Minnesota Med.* 1921, Jan., 9; [4]*Centralb. f. Chir.* 1921, Jan. 8, 2; [5]*Wein. klin. Woch.* 1920, Sept. 20, 848.

PERNICIOUS ANÆMIA.

Herbert French, M.D., F.R.C.P.

An extremely interesting study of 148 cases is published by Carr in an American journal.[1] The symptoms of onset as described on admission to hospital show that out of one group of 86 cases, 66 gave progressive weakness; 43 dyspnœa, especially on exertion; 34 œdema of the feet; 32 vomiting, without relation to the taking of food, but 1 only hæmatemesis; 26 loss of weight; 20 dizziness. In 57 cases in which gastric analyses were recorded, 53 showed no free HCl. The disease may be simulated exactly by the anæmia dependent on some definite factor such as carcinoma or tuberculosis. Of the 22 cases on which post-mortem examination was performed, 5 proved not to be pernicious anæmia. One was a case of Laennec's cirrhosis, with a colour index of 1·3, red cells 1,165,000, Hb 26 per cent, but a white count of 11,200. Another was aortic stenosis and regurgitation; in this the blood-count was compatible, with the exception of a relative leucocytosis. Streptococcic septicæmia was responsible for a third mistaken diagnosis; while a carcinoma of the ascending colon was the cause of death in a fourth case, in which the blood-picture was Hb 35 per cent, red cells 1,770,000, colour index 1·4, but the white count was here 12,400. A general conclusion is that great reserve should be exercised in making a diagnosis of pernicious anæmia when each of the characteristic blood-findings is not present. In 11 cases which were transfused, 9 showed marked improvement in the blood condition.

In the summary, the following points may be stressed: Ascites and anasarca are not symptoms of pernicious anæmia; and though there is a possibility that they may result from the cardiac condition, the event is so unusual that it demands explanation. Achylia gastrica is so much the rule that the presence of free HCl raises a doubt as to the diagnosis. The Wassermann reaction occurs infrequently; in 46 cases the percentage was 6·5. The diagnosis of pernicious anæmia should be made with the utmost reserve in the presence of a leucocytosis. Disease of the cord usually means a combined lesion due to the action on the posterior and lateral columns of a selective toxin not inflammatory and probably not syphilitic; the prognosis is more unfavourable in these patients, who are not likely to live long enough to develop advanced grades of anæmia.

Blood Volume in Pernicious Anæmia.—One does not yet know whether anything of real clinical value is to be learned from the determinations of the blood-volume in pernicious anæmia, either before or after transfusion, but an elaborate research upon the point has been carried out by Denny[2] by the carbon monoxide method in 10 cases, and details of the method employed and of the necessary calculations are given in his paper. A good deal more work is still wanted upon the question of blood-volume, not only in this but also in other diseases, before one can conclude that investigations in this direction are of value to the patient, or to the physician in treating patients suffering from pernicious anæmia or from other diseases ; but it is interesting to note that the plasma-volume was found to remain essentially normal in the 10 cases investigated, the decrease in total volume of the blood being due in the opinion of these observers to loss of cell-mass in the plasma. In two cases there was no reduction even in the total blood-volume, and in one of these the normal total blood-volume was associated with a plasma-volume well above the normal. Another conclusion which he came to, which is of some interest, is that there was no noticeable relationship between the severity of the disease and the decrease in the total volume of blood in the patient.

Work on the *blood chemistry* of the disease is reported by Gettler and Lindeman[3] in 87 cases. The following facts emerge : (1) The non-protein nitrogen, urea, and creatinine values are somewhat higher than normal ; (2) The uric acid is much above normal ; (3) The amino-acid content is greatly raised ; (4) The blood-sugar is abnormally high ; (5) The alkaline reserve is subnormal.

Estimations of the urobilin and urobilinogen in the urine and stools of pernicious anæmia patients have been made by Hanomann and Howard.[4] They find that this evidence of abnormal hæmolysis occurs first in the stools, second in the duodenal contents, and lastly in the urine. The increase is constantly present in these patients during remissions. A low red count with a low urobilin content indicates an arrest of the disease process and the expectation of a period of improvement, while the reverse indicates increased hæmolysis and often precedes a falling blood-count.

Stockton[5] records the death from pernicious anæmia of a patient in whom the disease was recognized twenty years previously. For twelve years she was free from all evidence of the disease, save one—achylia gastrica.

TREATMENT.—**Transfusion** is a self-limited process in pernicious anæmia, owing to the inadequacy of methods for selecting suitable donors. This is the conclusion of Harold M. Bowcock[6] in an article on "Serious Reactions to Repeated Transfusions in Pernicious Anæmia". When once this difficulty is discovered, no attempt to transfuse these patients should be made. The severe reaction is probably due to anaphylaxis and not to a hæmolysis *per se*. Blood matching should be carried out with the greatest care, and the incubation period should be at least two hours. Blood serum free from cells may produce bone-marrow stimulation. Members of *Group IV* cannot be regarded absolutely as universal donors.

The value of **Splenectomy** as a definite line of treatment in pernicious anæmia is still *sub judice*, and it is as yet very difficult to know whether the operation should be advised or not, but Giffin and Szlapka,[7] in a second report reviewing fifty patients with pernicious anæmia for whom splenectomy was performed (all more than three years previous to the time of their published paper), draw conclusions in favour of the operation if an immediate remission is sought for, and if life is to be prolonged. It is too much to say that anything like cure results from the operation in any case ; but without any particular selection of cases, immediate remission is likely to be hastened by the operation, and the life of the patient will probably be definitely prolonged. It is true that the operative mortality was 6 per cent, but out of their 50 patients 10 survived the operation itself, and 21·3 per cent of these survivors from splenectomy were alive three years, or longer, afterwards ; 5 patients, i.e. 10·6 per cent who recovered from the operation, had survived splenectomy for more than four and a half years and were still living, the total length of history of these 5 patients averaging about six years at the time of their publication. It seems that it may be stated with reasonable accuracy that in addition to the immediate remissions, which occurred constantly after splenectomy in their cases, splenectomy prolonged life in at least 20 per cent of all their cases. These authors were unable to satisfy themselves that any pre-operative characteristics of the disease were indicative that favourable results were likely to follow splenectomy; but in general that type of case in which there was evidence of active hæmolysis showed the more marked immediate improvement. Their impression is that splenectomy should be recommended in pernicious anæmia when, in view of all the circumstances, personal as well as medical, the possibility of the prolongation of life appeals to the family and to the patient; whilst the operation may also be performed when the object is to bring about an immediate and rapid remission of the severer degree of the anæmia.

REFERENCES.—[1]*Amer. Jour. Med. Sci.* 1920, Nov., 737; [2]*Arch. of Internal Med.* 1921, Jan., 38; [3]*Ibid.* 1920, Oct., 453; [4]*Jour. Amer. Med. Assoc.* 1919, Oct. 25, 1262; [5]*Amer. Jour. Med. Sci.* 1919, Oct., 471; [6]*Johns Hop. Hosp. Bull.* 1921, March, 83; [7]*Jour. Amer. Med. Assoc.* 1921, Jan. 29, 290.

PERTHES' DISEASE. (*See* ORTHOPÆDIC SURGERY.)

PHRENIC NERVE, TEMPORARY BLOCKAGE OF.

Sir W. I. de C. Wheeler, F.R.C.S.I.

Goetze[1] recommends a temporary inhibition of the phrenic nerve (of several hours' duration) under such varying circumstances as severe hiccough, tetanus, transpleural operations on or near the diaphragm, etc. For this purpose he injects 10 to 20 c.c. of a 1 per cent solution of **Novocain-adrenalin** along the anterior surface of the scalenus anticus muscle at a point three finger-breadths above the clavicle. Should a longer period of inhibition be desirable (one to three months) following upon operations for the relief of a chronic pleural empyema, he recommends Perthes' recent suggestion of 'freezing' the nerve (Vereisung) for five to fifteen minutes in its cervical course, as a harmless, practicable, and certain method.

[The first suggestions of phrenic blocking came in 1916 from Henschen, who successfully overcame the troublesome diaphragmatic movements during a transpleural operation. He directly injected several c.c. of 2 per cent novocain into the nerve immediately above its insertion into the muscle. —*W. I. de C. W.*]

REFERENCE.—[1]*Centralb. f. Chir.* 1920, No. 42, 1290.

PILES. (*See* HÆMORRHOIDS.)

PINEAL GLAND. (*See* ENDOCRINOLOGY.)

PITUITARY GLAND. (*See* CEREBRAL TUMOURS; ENDOCRINOLOGY; NEUROLOGICAL SURGERY.)

PITUITARY SURGERY, INSTRUMENT FOR USE IN.

Sir W. I. de C. Wheeler, F.R.C.S.I.

A. K. Henry[1] has devised an instrument which, used in conjunction with intermittent radiographic control, allows the pituitary fossa to be entered with mathematical precision by the transphenoidal route (*Fig.* 71). The instrument consists of two intranasal bars, which lie one on either side of the nasal septum. These bars bend downwards in front of the mouth and carry a pivoted rod with a terminal cap which enters the mouth. This cap presses against the hard palate, when by means of a screw the rod is approximated to the vertical bars; this rigidly fixes the instrument in position. Attached to the vertical bars are two plates: between these a tube is pivoted which can be inclined so as to aim at the pituitary fossa. The aim is controlled by means of radiography. The method admits the use of any manipulation which can be carried out through a tube. Instruments like those used with a cystoscope (with handles properly graduated) are available, or radium may be inserted.

Reference. — [1] *Dublin Jour. Med. Sci.* 1921, April.

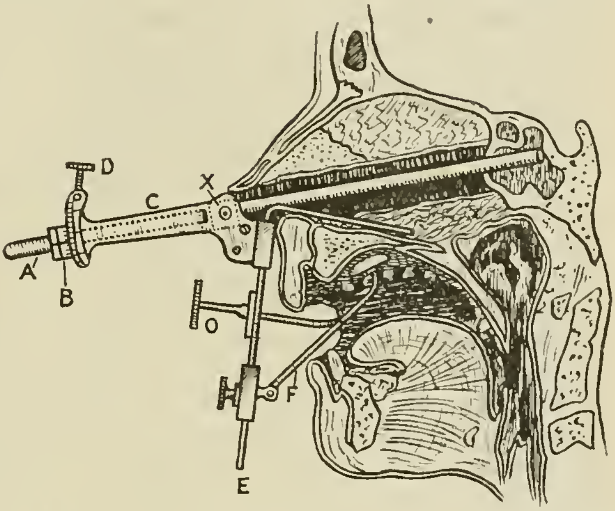


Fig 71.—A, Graduated handle of trephine projecting from the square end of the tube B, which carries a vernier. This travels on the scale marked in degrees on the plate C. The tube B is pivoted at X between this plate and its fellow. D, Screw for regulating the inclination of tube B. E, one of the two bars which enter the nasal fossæ. These bars support F, the intrabuccal rod and cap, which are fixed by turning the screw O.

PLAGUE.

Sir L. Rogers, M.D., F.R.C.P., F.R.S.

F. W. Cragg[1] points out that the Plague Commission worked in India when only one species of the genus *Xenopsylla*, viz., *cheopis*, was recognized on Indian rats, since which two more rat species have been discovered in India, namely, *brasiliensis* and *astia*, which can only be differentiated by minute differences in the bristles recognizable with the compound microscope. Hirst found *astia* to be the predominant species in Colombo, and this species bites man with great reluctance at temperatures over 80°, and rarely attacks guinea-pigs, while it proved very difficult to transmit plague from rat to rat by this flea. Cragg now records the first results of a study of the distribution of these rat fleas in different parts of India, which indicates that *astia* is more common in the damp hot provinces of Madras and Lower Bengal, where plague has never been very serious, which is most suggestive. J. C. C. Kundardt and C. D. Chitre[2] deal very fully with preventive plague work at Poona in India from 1914 to 1918, based on concentrating their efforts on places which they had located as likely to harbour plague infection during the off season, which they were successful in locating in the great majority of instances. On the other hand, the rat-destroying methods they used failed to be of much service; but in their second paper they show that barium carbonate in 3-gr. doses in bajri dough was many times as effective as previously used poisons and should give better results.

Treatment.—S. M. Vassalo[3] records a small series of plague cases in Uganda in which good results followed the use of **Iodine** intravenously (as formerly used in India by Connor—*see* Medical Annual, 1914, 440). Out of 20 cases 16 recovered, a freshly prepared solution of iodine 1 dr., potassium iodide 1 oz., and alcohol 20 oz., 10 to 15 min. in 2 oz. of distilled water, being injected intravenously, and half as much repeated in 24 hours if a fall in temperature is followed by another rise.

References.—[1] *Ind. Jour. Med. Research* (Sci. Congress No.), 1920, 29; [2] *Ibid*, 1921, viii, 419–489; [3] *Jour. Trop. Med. and Hygiene*, 1921, 92.

PNEUMONIA.

Arthur Latham, M.D., F.R.C.P.

Brooks and Carroll[1] come to the following conclusions :—

1. The most frequent immediate cause of death in all types of pneumonia is cardiac failure.

2. In by far the larger number of instances this failure is due to right heart deficiencies.

3. This occurs because of the very limited muscle reserve capacity of the right heart, plus a myocardial degeneration, the result of toxæmia.

4. The preparatory and emergency use of drugs, chiefly of the **Digitalis** group, fortifies the heart against these tendencies.

5. Rest, properly timed **Venesection**, and numerous other adjuvant measures are frequently of great therapeutic utility.

TREATMENT.—Carl Klein[2] states that much has been claimed for **Camphor** in the treatment of pneumonia: (1) It is stimulating to the heart muscle, and raises the blood-pressure by acting on the vasoconstrictor centres; (2) The pneumonic exudate is more quickly absorbed as the pulmonary vessels are dilated, and thus more blood, with more polymorphs and their ferments, is determined to the lungs; (3) It is said to exert a definite bactericidal action on pneumococci; (4) It brings comfort to the patient, as it lessens pain; (5) The temperature falls earlier, and usually by lysis; and (6) The mortality is lowered by its use. Klein summarizes the present views on camphor, and also points out the dangers in its use. He suggests that, in addition to causing delirium and hallucinations, camphor may cause paralysis of the respiratory centre.

Henry J. John,[3] as the result of an investigation into the use of a 10 per cent aqueous solution of **Glucose** (commercial) intravenously, concludes:—

1. That the administration of glucose is without danger, provided any reasonable care is used. In the 1200 administrations not a single accident developed.

2. That the patient is made comfortable, and sleep is provided for him. Through this the whole organism is strengthened for the prolonged fight against the infection.

3. That the temperature is lowered.

4. That nourishment is provided for the overtaxed heart muscle without having to go through the ordinary digestive processes—storage in the liver as glycogen, and reconversion into glucose again before it can be burned by the tissues; 100 to 300 calories is thus supplied to the body at each dose.

5. That a considerable amount of fluid is provided for the circulation. This, together with the preceding, slows the heart, thus producing artificial rest.

6. That the elimination through the kidneys and the skin is increased.

7. That practically all the medication can be supplied in the glucose; thus a much more accurate dosage can be depended on.

8. That the antipneumococcic serum *Type I*, the antistreptococcic serum, or the antitetanic serum, can be administered in this glucose medium. This is far superior to saline, for glucose will do much more than saline, thus being a much more rational medium to use as a diluent for any intravenous medication.

9. That the use of glucose is strictly a physiological measure, and is to be used as such.

Walter L. Niles,[4] in discussing the **Serum** treatment of lobar pneumonia, emphasizes the following conclusions:—

1. An exact etiological diagnosis should be quickly made in every patient suffering with lobar pneumonia.

2. With very few exceptions, *Type I*, pneumococcus infections should be treated with *Type I* antipneumococcus serum.

3. The serum should be given in large doses (generally 100 c.c.), and repeated every eight hours until the temperature falls and remains below 102°; if it subsequently rises the administration of serum should be repeated, unless complications, which should always be suspected, are determined.

4. The serum treatment should be commenced as early as possible ; it should reach the vein at about the body temperature, and the first 15 c.c. should be given slowly.

5. Polyvalent serum should never be given, and *Type I* serum should be administered only to proved *Type I* infections.

6. The serum treatment as above outlined reduces the mortality of *Type I* infection more than 50 per cent.

REFERENCES.—[1]*Amer. Jour. Med. Sci.* 1920, Dec., 815 ; [2]*Med. Klinik,* 1920, xvi, 953 ; [3]*Amer. Jour. Med. Sci.* 1920, Oct., 542 ; [4]*N. Y. Med. Jour.* 1921, June 15, 871.

POISONING. (*See also* SCHOOL MEDICAL SERVICE.)

Herbert French, M.D., F.R.C.P.

Methyl Alcohol.—Prohibition in the United States is responsible for a number of cases of poisoning by the substitutes for whisky which are obtainable at very high prices by those who miss their accustomed beverage. The number of fatalities due to methyl alcohol or wood spirit has increased very much, and though at present there is happily no likelihood of a similar increase in Great Britain, yet it may be as well, in view of possibilities, to draw attention to the very definite train of symptoms due to this substance. Dana Hubbard[1] and Raphael Isaacs[2] both give full accounts of the symptoms, pathology, and treatment of the condition.

The former divides the symptoms into three degrees : (1) An ordinary mild intoxication, with dizziness, nausea, and gastro-intestinal symptoms, occasionally followed by a more or less serious damage to vision ; (2) A more pronounced effect, with marked dizziness, persistent nausea and vomiting, and dimness of vision often increasing to blindness ; (3) An overwhelming prostration which terminates in coma and death. The characteristic feature is affection of vision, which, according to the severity of the condition and the susceptibility of the patient, varies from dimness to total blindness. The latter may come on in a few hours or not for several days, to be followed by a partial restoration of vision which again gives place in a few days or weeks to more or less complete and permanent blindness with atrophy of the optic nerve. When the stage of collapse with dilated reactionless pupils is reached, recovery rarely follows.

The treatment consists in elimination and alkalization. The stomach tube is used up to the end of twelve hours after taking the poison, and then, if able to swallow, the patient is given 3 grm. of **Sodium Bicarbonate** in about 250 c.c. of water every two hours for six doses. If he is unconscious, the bicarbonate is given intravenously—1000 c.c. of a solution of sodium carbonate 0·37 per cent and sodium chloride 1·4 per cent.

Nitrobenzol.—Nitrobenzol[3] has been responsible for a number of cases of poisoning, some in industrial conditions—as for instance in the manufacture of shoe polish ; others where nitrobenzol has been present in some substitute for liquor. It is extremely toxic, not only when taken by the mouth, but it may be absorbed through the skin and through the respiratory tract by inhalation. It acts by depriving the blood of its function of carrying oxygen, and the appearances caused by it are characteristic—pallor, livid purple lips and finger-nails, collapse, unconsciousness, and convulsions. The urine is almost black in colour, or there may be anuria. Slowness of onset and rapidity in recovery are other striking points. The treatment is symptomatic, but **Bleeding** and **Transfusion** are logically indicated.

Arseniuretted Hydrogen.—This is another poison which gives rise to a dark urine. Wignall[4] deals with cases he has seen occurring industrially in workers on processes in which nascent hydrogen is liberated—e.g., lead-burners.

When inhaled frequently in very slight amounts, arseniuretted hydrogen gives rise to jaundice, weakness, anorexia, and a rapid feeble pulse with low tension. Hæmaturia results, owing to hæmolysis and a destructive action on the renal tubules and epithelium. Methæmoglobin also occurs in the urine.

Carbon Monoxide.—In a long article on the histopathology of carbon monoxide poisoning, Stewart[5] describes the changes in the nervous system due to this agent which are responsible for the permanent damage and rare recovery of those exposed to its action for any prolonged period. He finds throughout the whole of the cerebral cortex a narrow stratum of softening, which occurs almost continuously in the deeper or infragranular layer of the grey matter. The basal ganglia and the cervical grey matter are also more severely damaged than other localities. In the white matter there is widespread degeneration of the myelin sheaths of the nerve fibres. Generalized thrombosis as a result of a hæmatogenous intoxication appears to be at the bottom of these changes.

Borax.—Potter[6] records a case of fatal borax poisoning where the victim swallowed about an ounce of borax in mistake for a saline cathartic. Nothing abnormal was found post mortem.

Morphine.—In morphine poisoning Professor Brauer[7] uses insufflation of **Oxygen.** In his opinion morphia proves fatal chiefly on account of the CO_2 intoxication which it causes. He recommends previous tracheotomy. A long soft rubber catheter, which fits very loosely in the tracheotomy tube, is attached to the oxygen cylinder with the interposition of an air-filter and also of a contrivance for keeping the oxygen moist. When the end of the catheter reaches the bifurcation of the trachea or one of the bronchi, coughing is provoked and thus helps to clear the respiratory passages. As long as the oxygen is not allowed to escape too quickly the lungs cannot be over-distended, for the gases can easily escape between the catheter and the tube as well as by the pharynx. He finds remarkably rapid improvement as a result of the treatment.

Poisonous Substances in Rubber Tubing.—A possible source of poisoning is shown by Walter I. Galland[8] to exist in the use of rubber tubing. He states that he was led to undertake this work on account of the report of untoward results following on infections of arsphenamine being traced to a certain brand of rubber tubing. His previous experience of five years as chemist in a rubber manufacturing plant renders his contribution more valuable. The finished article of rubber contains from 10 to 80 per cent of rubber. the remainder being made up of the so-called fillers. These are the accelerators or sulphur carriers which aid in the completion of the vulcanizing reaction, and most frequently litharge, antimony pentasulphide, or magnesium oxide is used ; in addition, urea, thio-urea, and aniline may be employed. A pure compound of rubber and sulphur only is seldom seen on the market ; red rubber, which is commonly believed to be pure, owes its colour entirely to colouring fillers, and a large number of these red rubbers are compounded with antimony pentasulphide as a filler. A series of experiments on nursing nipples demonstrated that 9 out of 13 of these gave an extraction of almost emetic strength under working conditions.

A normal solution of NaOH poured into a metre length of red-rubber tubing and allowed to remain for one hour at room temperature was found to contain the equivalent of 10 mgrm. of tartar emetic at the end of the time. The sulphides of antimony are soluble in alkaline solutions, and in the alkaline solutions of arsenobenzol compounds we have potent solvents of antimony, ¾ gr. of which has proved fatal to a child and 3 gr. to an adult. The symptoms which are caused by an intravenous toxic dose of antimony are nausea, vomiting, trembling, cold sweat, depression, diarrhœa, cramps, prostration, and death. These are suggestive in view of the symptoms we have all seen to follow injections of the arsenobenzol compounds.

Senecio Poisoning.—Willmot and Robertson[9] give an account of their observations in some cases of senecio poisoning. For at least ten years, cases of sickness with abdominal pain, vomiting, and ascites of obscure causation have been recorded in the George and Mossel Bay districts of Cape Province, South Africa. Eighty cases have been observed, and many of them were fatal. The investigations of these authors show that plants of *Senecio ilicifolius* and *Senecio burchelli*, which grow as weeds in the wheat-fields at George, are responsible for these cases. When the wheat is threshed, seeds and portions of the plants of these weeds remain, and are sold with the wheat. If the winnowing be not efficient, the seeds are ground up with the wheat in the milling and are sold with the flour. The disease occurs in the poorer class of Europeans, whose staple food is bread, and begins with digestive disturbances like ordinary dyspepsia. Nausea is the first noticeable symptom, followed by vomiting and acute pain in the stomach. Diarrhœa may or may not be present, and blood may be present both in the vomit and the stools. The liver rapidly enlarges, and ascites occurs in all severe cases. The temperature is usually normal or subnormal. Death may occur as early as the fourteenth day after onset of acute symptoms, or may be delayed for two years. The prognosis in fully developed cases is bad. Post mortem, typical cirrhosis of the liver is found in all stages, according to the duration of the condition. The stomach contains dark-brown coffee-ground material; and numerous small ulcers, which vary in size from a pin's head to a pea, are found in the greater curvature a short distance (1½ in.) from the pylorus. Experimental feeding of guinea-pigs and rats with senecio heads and seeds produced just the same symptoms as are recorded in the case of human beings, and post mortem the findings were identical.

Treatment is symptomatic and unsatisfactory, prevention rather than cure being the obvious means of attack.

Lead.—A possible source of lead poisoning from food would appear to be found in the glaze of pottery ware. Helen Masters[10] states that a 1 per cent solution of citric acid, after being boiled in various casseroles for half an hour, contained an appreciable quantity of lead. Further experiments were made in which 100 grm. of various fruits and vegetables were cooked in the casseroles. The food material was then evaporated and ignited and the ash extracted with ammonium acetate. In the case of one casserole in which lemon-juice had been boiled, 25 mgrm. of lead were recovered. The use of leadless glaze seems to be strongly indicated.

REFERENCES.—[1]*N. Y. Med. Jour.* 1920, Jan. 3, 16; [2]*Jour. Amer. Med. Assoc.* 1920, Sept. 25, 718; [3]*Amer. Jour. Med. Sci.* 1921, April, 539; [4]*Brit. Med. Jour.* 1920, i, 826; [5]*Jour. Neurol. and Psychopathol.* 1920, Aug., 105; [6]*Amer. Jour. Med. Assoc.* 1921, Feb. 5, 378; [7]*Beitr. zur Klin. de Tuberculose*, xlvi, Hft. 1; [8]*N. Y. Med. Jour.* 1921, Feb. 17, 334; [9]*Lancet*, 1920 ii, 848; [10]*Lancet*, 1921, June 26.

POLIOMYELITIS, ACUTE ANTERIOR (*See* INFANTILE PARALYSIS; ORTHOPÆDIC SURGERY.)

PREGNANCY, DISORDERS OF. (*See also* HEART DISEASE, PREGNANCY IN.)

W. E. Fothergill, M.D.

Toxæmias of Pregnancy.—R. L. Mackenzie Wallis[1] writes on the toxæmias of pregnancy, with special reference to the value of certain renal function tests in diagnosis. The writer has examined pregnant women with albuminuria with the object of establishing means whereby a differentiation can be made between the true toxæmias of pregnancy and nephritis occurring in pregnancy, He has worked with four tests, namely: (1) The estimation of diastase in the urine; (2) The ratio of albumin to globulin in the urine; (3) The urea content of the blood; and (4) The urea concentration test of MacLean. In the toxæmias of pregnancy the most reliable test is the diastase estimation in the urine, and this gives figures considerably higher than those regarded as normal. The proportion of globulin in relation to albumin is also raised in these conditions. The results obtained in the toxæmias of pregnancy suggest that the toxin (or toxins) is present in the maternal blood, and exerts its primary effects on the blood-vessels, producing in the case of the kidney an acute glomerulitis or nephrosis. The same action of the toxin on the cerebral vessels may explain the occurrence of eclamptic fits. The investigation of any case of albuminuria in pregnancy should commence with an analysis of a fresh specimen of urine for globulin, albumin, casts, and the diastase content. In a case of suspected toxæmia this should suffice, since all the other tests yield results which, strictly speaking, are negative. The cases of nephritis in pregnancy, on the other hand, present so many and varied aspects that all four tests are required before coming to any conclusion as to the efficiency of the kidneys. The presence of albumin and casts with a subnormal diastase output is ascertained by the first analysis, but the urea content of the blood is important for diagnosis and prognosis. Normally the blood contains from 0·02 to 0·05 grm. per cent of urea. When this rises to 0·1 per cent there is some retention of urea, and the blood content may rise to even 0·8 per cent, when the issue is usually fatal. But the urea content of the blood does not give any clue as to the imminence of uræmia, and its estimation is only of secondary importance. MacLean's urea-concentration test has proved to be of value. The fasting patient is given 15 grm. of urea by mouth, the bladder being empty. An hour later, and again at the end of the second hour, the bladder is emptied. The urea in the specimens is estimated by the hypobromite method, and the result recorded in percentage of urea passed in each specimen. Normally the urea concentration is 2 per cent or more, and a smaller amount indicates renal insufficiency.

In the toxæmias of pregnancy the blood shows no striking deviations from that of ordinary pregnant women, as the blood-urea content is usually within the normal limits of 0·02 to 0·05 grm. per cent. The same is true of the sugar in the blood, which is nearly always normal—0·08 to 0·10 grm. per cent. The fact that the blood-sugar content is normal in this condition would negative the view that toxæmias of pregnancy are associated with one or more of the endocrine glands, for disturbance of function of almost all these glands is reflected in the blood-sugar content and a consequent disturbance of carbohydrate metabolism. The writer has never seen any case of glycosuria in pregnancy develop a toxæmia, nor has he found a case of eclampsia or toxic vomiting showing hyperglycæmia or glycosuria. The writer makes an interesting note on the ordinary so-called neurotic vomiting in pregnancy. In this the diastase content of the urine has been found to be normal. The vomiting leads to the appearance of acetone bodies in the urine and with it a high ammonia coefficient. This he has found much higher in neurotic vomiting than in the true toxæmias of pregnancy, and consequently the estimation of the ammonia coefficient does not give results of any value either for diagnosis or prognosis. This is good news for those who have always thought that this estimation gave more trouble than it was worth.

Pre-natal Death.—Arthur Robinson[2] refers to the general belief amongst those who concern themselves about the falling birth-rate that sterility, pre-natal death, and abortions are generally, if not entirely, due to disease. Judging by the statements of text-books this view is, to some extent, shared by obstetricians. It appears to be assumed that any ripe extruded ovum is capable of fertilization by any spermatozoon in any given group of healthy animals; and further, that if any embryo is obviously abnormal this must be due to external detrimental conditions. Robinson shows, by the study of the results of matings of mares and ferrets, that pre-natal death of extruded ova and of some of the zygotes formed from them is of frequent and regular occurrence in healthy animals under normal conditions, and is therefore normal. In view of the belief that every ovum under favourable conditions should produce a living child, the conclusions derived from the investigation of healthy animals under normal conditions is of great practical importance. The evidence produced shows: (1) That some sterility is normal and unavoidable; (2) That a considerable amount of pre-natal death is normal and usual, and, under ordinary circumstances, cannot be avoided; (3) That a considerable number of abortions are not only normal but necessary, for they are adapted to prevent diminution of the birth-rate; (4) That the condition of the uterine mucosa associated with normal abortions is not degenerative or diseased, but normal, and that any treatment of it is not only unnecessary but will probably also be detrimental.

The author's estimate that the normal pre-natal mortality-rate is about 40 per cent is based only on indications given by horses, ferrets, swine, and rabbits. He points out that it may be higher or lower, but is more probably higher, for human beings are living in much more artificial surroundings than are the other animals mentioned. He sums up as follows: (1) A considerable amount of pre-natal death is normal in mammals. (2) It is due partly to the inability of gametes of certain individuals to unite with one another, and partly to the production of abnormal zygotes by the union of certain gametes. (3) The inability to unite, and the production of abnormal zygotes when union occurs are not dependent on disease or abnormal environment of the parents. (4) When pre-natal death occurs, as it does in many cases, after the zygote has become attached to the decidua, the death must be followed by the absorption or the abortion of the zygote. (5) Abortions which follow normal pre-natal death are themselves normal, and the changes found in the uterine mucosa in such cases are regressive and useful, and not inflammatory or degenerative.

REFERENCES.—[1]*Jour. Obst. and Gynæcol. Brit. Emp.* Vol. xxviii, No. 1, 3; [2]*Edin. Med. Jour.* 1921, March, 137, and April, 209.

PROLAPSE, GENITAL. (*See* GENITAL PROLAPSE.)

PROLAPSE OF THE RECTUM. (*See* RECTUM, PROLAPSE OF.)

PROSTATE, RETENTION IN ENLARGED. (*See* BLADDER, DISEASES OF).

PROSTATE, SURGERY OF. (*See also* BLADDER.)

Sir John Thomson Walker, F.R.C.S.

Herring[1] discusses the cause of chronic *retention of urine arising from prostatic disorder*, and its treatment without operation. The escape of urine is prevented in the normal state by the resistance the prostatic urethra offers to dilatation. The channel is always tightly closed, and is only open when the pressure from the urine in the bladder exceeds its power of resistance. Normally, the bladder expulsive power and the prostatic resistance are so balanced that they allow of the complete evacuation of the bladder. If the prostatic resistance is increased, the expulsive power remaining the same, a point will be reached during evacuation, and before the bladder is empty, at which no more urine can be thrown out, and residual urine is the result. If the resistance exceeds or is equal to the maximum expulsive power the bladder is capable of exercting, total retention will follow. If the resistance falls below the normal, urine will be expressed more frequently.

Instrumental treatment of retention from prostatic enlargement has the following objects: (1) To preserve intact the activity of the existing muscle by exercise; (2) To prevent the exhaustion which will follow an inefficient struggle; (3) To reduce the prostatic resistance artificially; (4) To develop the bladder muscle.

From a study of 56 cases of urinary retention due to prostatic obstruction, O'Conor[2] makes a number of observations on the *blood-pressure.* The average age of the patients was sixty-one, and 55 of the cases were operated on. When the bladder is kept at complete rest by an in-dwelling catheter or by suprapubic cystotomy, an appreciable fall in blood-pressure occurs in the first twenty-four hours. The average fall in systolic pressure was 40 mm. of mercury, while that in diastolic pressure was 45 mm. The most marked diminution occurred in patients who presented themselves with a pronounced hypertension associated with a considerable amount of residual urine (400 c.c.). The fall appeared to depend on two factors, the quantity of residual urine and the degree of reduction in the renal function. The greatest drop in the first twenty-four hours after constant drainage was 85 mm. in the systolic pressure and 45 mm. in the diastolic. The patients operated on at a time when the blood-pressure was still decreasing each day, even though the actual tension was itself satisfactory, suffered from proportionately greater operative disturbance than those in whom it had become stationary. This showed that the pre-operative treatment was not sufficiently prolonged, although the patient's general condition appeared satisfactory and the renal function was adequate. Accordingly, no operation was performed until the blood-pressure had maintained a definite level for at least four days. When drainage was satisfactory, 60 per cent of patients had a subsequent rise in blood-pressure after the period of decline. The average rise in systolic pressure was 16 mm. and in diastolic pressure 5 mm. In patients where the blood-pressure had reached a definite fixed level, the degree of post-operative fall was very slight. The relative changes in blood-pressure after operation varied considerably. Twenty per cent of the patients had no subsequent rise; the rest had a subsequent rise varying from 10 to 40 mm. of mercury. The period of observation ranged from one to seventeen months.

In an Arris and Gale lecture on the *function of the kidneys in enlargement of the prostate gland,* Dobson[3] draws the following conclusions: Blood-urea estimation is a reliable guide to the functional capacity of the kidneys, and should be carried out in all cases before operation. Blood-urea over 25 per cent points to the necessity of preliminary treatment, with drainage of the bladder by catheter or by cystotomy. Where the retained catheter is used and blood-urea estimations do not show improvement, suprapubic cystotomy should be done. When the blood-urea figures fall under 30, prostatectomy may be employed. Preliminary cystotomy and regular antiseptic instillation is recommended for cases of impaired renal function, whether due to back-pressure only or to back-pressure and renal infection. If the blood-urea figures are normal with a badly infected bladder, one may assume that the kidneys are not yet infected.

Johnson[1] discusses the use of *x rays in the diagnosis of prostatism.* Three exposures are made. Plate 1 is taken with the bladder empty, to locate calculi in the prostate or bladder, and to outline gas in the bowel that might confuse the reading of plate 2. Plate 2 is made with the bladder full of air in order to outline the enlarged prostate. Plate 3 is made after filling the bladder with 10 per cent sodium iodide or a bromide solution, in order to outline diverticula, to show the size and shape of the bladder, and to indicate the presence of sacculus or dilated patulous ureters.

Gardner[5] reviewed the *contra-indications of prostatectomy.* The mortality of the general surgeon, he stated, is about 25 per cent, and this decreases to less than 1 per cent as the ability of the surgeon increases. The cause of death was uræmia in 60 per cent of the fatal cases. The condition was caused principally by back-pressure, and the function could be relieved by an indwelling catheter, recurrent catheterization, or cystotomy. The author prefers cystotomy under local anæsthesia. The time of operation is reduced by the preliminary cystotomy, and shock avoided. Hæmorrhage, he believed, might be the most frequent cause of death, and was encouraged by irrigation. Packing the cavity, or the Hagner bag, was the best method of control, and he prefers the latter. In the discussion that followed, the views on the retained catheter as opposed to preliminary cystotomy varied, and Fowler pointed out that in St. Louis, New York, and Los Angeles the urethra was stated to be insensitive, while in Buffalo, Chicago, and Washington it was highly sensitive to the retained catheter.

Martin[6] enumerates the following *facts in favour of early operation in enlarged prostate*: (1) An enlarged prostate tends to increase in size, leading to complete retention and attacks of cystitis, pyelitis, and uræmia ; (2) If the obstruction remains unrelieved, the kidneys are slowly destroyed by back-pressure, diminishing the chances of successful operation at a later date ; (3) The earlier the operation is performed, the more able is the patient to stand shock, uræmia, and infection. The author advises waiting for six or twelve months if the prostate is small, meanwhile keeping the patient under close observation.

Thomson Walker[7] discusses the risks to which a patient is exposed when suffering from enlarged prostate, whether he is submitted to operation or treated without, and arranges them under the different systems, viz., gastro-intestinal, pulmonary, circulatory, nervous, and urinary.

Post-operative distention of the bowel may vary from flatulent distention and constipation for a few days after the operation, to prolonged distention of the bowel ending fatally from interference with the heart's action. Rarely, it occurs as a very acute condition and is rapidly fatal. Post-operative distention may occur also after kidney operations, when it is partly due to local atony of the colon from manipulation. In prostate and bladder cases it is due to flatulent distention of the bowel from intestinal fermentation, and to exhaustion of the sympathetic nervous system from uræmia, intestinal toxæmia, or shock. The author described a thin and a stout type of patient in which this complication was liable to occur, and insisted on the importance of oral sepsis as a cause. Pre-operative treatment consisted in the restriction of starchy foods and green vegetables, bowel antiseptic treatment, and bowel tonic treatment. A capsule containing **Naphthol** 5 gr., **Salol** 5 gr., and **Calomel** $\frac{1}{6}$ gr., and also capsules of **Kerol** (intestinal), were valuable. **Vegetable Aperients** should be preferred to salts and aperient waters. **Strychnine, Ergot,** and **Suprarenal** and **Pituitary Extracts** were tonics for the bowel muscle. Post-operative treatment consists in an early dose of **Castor Oil.** If there is distention of the stomach and persistent vomiting, it should be washed out. When the colon was affected, pituitary-gland extract was the best drug, but should be used with caution ($\frac{1}{2}$ c.c. at first, and later 1 c.c. daily) ; in addition, a **High Rectal Tube, Washing of the Colon,** and **Enemata.** Care should be taken in giving enemata such as turpentine in old men, on account of the danger of sloughing of the rectum.

Barney[8] discusses the *result in 34 cases of perineal prostatectomy.* Three patients died shortly after the operation. In 21 cases the late results were obtained: 11 cases were completely successful; of the 10 other cases, 2 never regained complete control and had to wear a rubber urinal, 1 had prolonged difficulty from the breaking down of the preliminary suprapubic cystotomy wound, 2 developed calculi, 1 died some months after litholapaxy, 1 had perineal fistula for nearly a year, with a tendency to stricture at the bladder neck, and 3 died of malignant growth involving the bladder, although the prostate had been reported benign. One patient developed melancholia. The author is dissatisfied with the post-operative results of perineal prostatectomy, and considers the suprapubic two-stage operation the best and safest procedure.

Deavor[9] *drains* through a tied-in catheter after suprapubic prostatectomy, and uses also a suprapubic drainage tube. Post-operative hæmorrhage is checked by flushing the bladder at frequent intervals with ice-cold boric lotion. The upper tube is removed in from two to four days.

Berndt[10] adopts *median perineal prostatectomy.* The operation is carried out under local anæsthesia with ½ per cent novocain solution. A median perineal incision is made on a staff, and the left forefinger introduced into the bladder. A blunt-pointed knife is guided by the finger, and the prostatic coverings are incised; the right forefinger replaces the left, and the prostate is enucleated. A four-bladed straight speculum is introduced, and through this a soft rubber tube is passed and the bladder irrigated with saline solution. Finally a rubber tube the size of the finger, round which is rolled vioform gauze, is placed in the bladder and fixed in position after removal of the speculum. The drainage tube is removed in ten days, and the bladder washed through a soft rubber tube until the wound is contracted, when the washing is done through the urethra. The advantages claimed for this operation are:—

1. The prostate is reached by the most direct and simplest way.
2. The entire outer capsule of the prostate remains completely untouched as in the Freyer operation; this is of importance for the control of bleeding and the post-operative continence.
3. The outer prostatic capsule remains in its natural relation to the rectum, so that wounds of the rectum need not be feared.
4. Control of bleeding is easy.
5. In most cases the operation can be carried out under local anæsthesia: only for the enucleation of the prostate itself is it sometimes necessary to give some ether.
6. The after-treatment is simple, and the patient can get up on the day of the operation.

Farr[11] has introduced a *suprapubic prostatic tractor* which is passed through the suprapubic wound for a varying distance into the prostatic urethra. The instrument obviates the necessity of introducing the finger into the rectum.

Rodelius[12] recognizes two *complications after prostatectomy,* namely infection and hæmorrhage. For hæmorrhage he uses firm packing round a rubber catheter. When the bleeding occurs after the patient has returned to bed, he employs irrigations with hot salt solution, which may be continued for some days; a disadvantage is that the quantity of urine secreted cannot be estimated. In two-stage operations healing is notoriously bad, and it is often delayed for many months, and may even break down after secondary sutures. These heal quicker after irrigation, and it is important that a large drainage tube should only remain in the wound for a few days, and be then replaced by a small tube such as a small Nélaton catheter. An Irving box is used in all cases.

Thomson Walker[13] collected 16 cases of *obstruction after suprapubic prostatectomy*, discussed the treatment, and described an open operation for the prevention of the condition. Obstruction in these cases was due to the formation of fibrous tissue in the area from which the prostate had been removed (*Fig.* 72). In 14 of the 16 cases contraction occurred at the outlet of the bladder into the prostatic cavity, and in 2 cases at the junction of the prostatic cavity and the urethra. The obstruction might appear early and cause delay in commencing to pass urine, with persistence of the suprapubic fistula, but in other cases it occurred after the suprapubic wound had healed. In one case the interval was several months, and in another four years. A suprapubic fistula persisted in 8 of the 16 cases, and in 4 of these all the urine was passed by the fistula. When the wound healed completely or intermittently, the symptoms were those of severe obstruction with periods of retention. In those cases the patients were on catheter life, the catheter being passed with great difficulty. In 2 cases operation showed the internal meatus completely closed, no trace of an opening being found ; in 2 the opening would only take a fine probe ; and in 2 a very fine catheter could be passed, but was tightly wedged in the internal meatus. In the remaining cases the internal meatus was small, round, ringed with fibrous tissue, and open. In 2 cases there were dense masses of fibrous tissue in the prostatic cavity at its urethral end. These cases had been treated after the operation by dilatation with metal sounds, and in some cases by opening the bladder and forcing a catheter through the obstruction. Thomson Walker operated on 10 of the cases, opening the bladder freely and dissecting away all fibrous tissue so that a wide opening from the bladder into the prostatic cavity was provided.

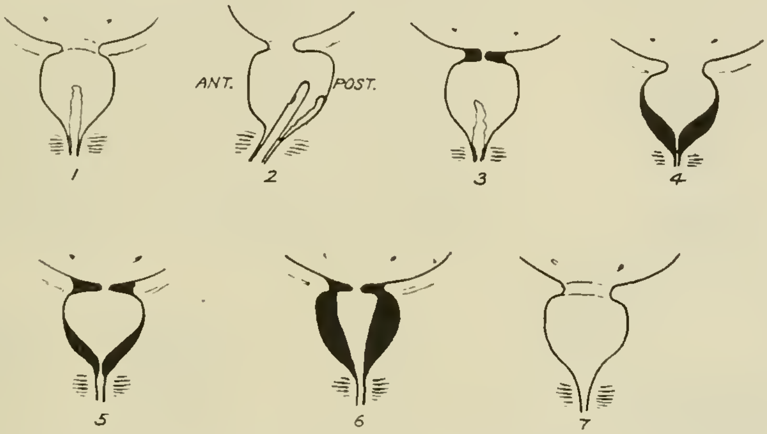


Fig. 72.—Prostatic cavity after suprapubic prostatectomy. (1) Coronal section showing prostato-vesical opening (dotted lines), strip of prostatic urethra on posterior wall, and compressor urethræ muscle ; (2) Sagittal section with catheter, showing posterior ledge ; (3) Fibrous contraction at prostato-vesical opening ; (4) Fibrous contraction at prostato-urethral outlet ; (5) Fibrous contraction at both outlets ; (6) Fibrous tissue in wall of cavity ; (7) Prostatic cavity after removal of fibrous masses.

For the prevention of post-prostatectomy obstruction the author has introduced an open operation. The prostate is enucleated with the right forefinger through a free suprapubic opening. No finger is introduced into the rectum. The patient is placed in the Trendelenburg position, the author's self-retaining retractor introduced, and the prostatic cavity freely exposed (*Fig.* 73). The hæmorrhage comes usually from one or more vessels beneath the mucous membrane of the internal meatus, and is controlled by fine catgut stitches. Venous bleeding is controlled by temporary plugging. All flaps of mucous membrane, strips of capsule, shreds of prostatic tissue, and detached strips of urethra are removed (*Fig.* 74). A large wedge with its base anterior is excised from the ledge always present at the posterior segment of the internal meatus, which removes all possibility of narrowing at the prostatic vesical opening. The bladder wall is sutured round a large tube, and the abdominal wall repaired.

Fullerton[14] describes 3 cases in which stenosis of the internal meatus occurred after suprapubic prostatectomy. He avoids this by slitting the vesico-prostatic septum posteriorly with scissors after grasping the margin with Lane's tissue forceps.

In a discussion on the *remote results of the operation for enlarged prostate*, Pousson[15] stated that fistula followed perineal prostatectomy in 7·7 per cent, and the suprapubic operation in 1·2 per cent. Suprapubic fistula permits of easy collection of the escaping urine. Perineal fistulæ are seldom exclusively urinary, but are also fæcal, and permit of communication which threatens life between the bowel and the bladder. Pousson has seen obliteration of the neck of the bladder after prostatectomy, and also distortion of the prostatic canal with retention of urine in recesses causing abscess and fistula. Renewal of prostatic enlargement after prostatectomy is rare, and is due to incomplete operation, the perineal operation being more liable to this sequel than the suprapubic. Post-operative calculi are more common after suprapubic than after perineal prostatectomy. Incontinence is rare after suprapubic, but more common after perineal, prostatectomy.

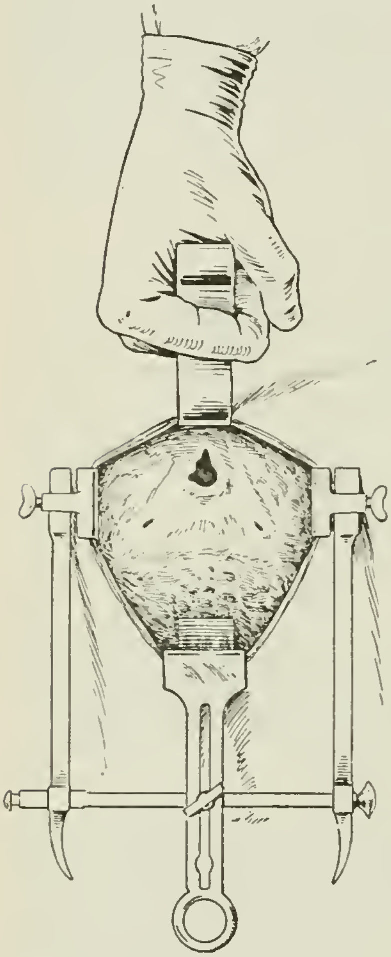


Fig. 73.—Exposure of bladder base and prostato-vesical opening after enucleation of prostate.

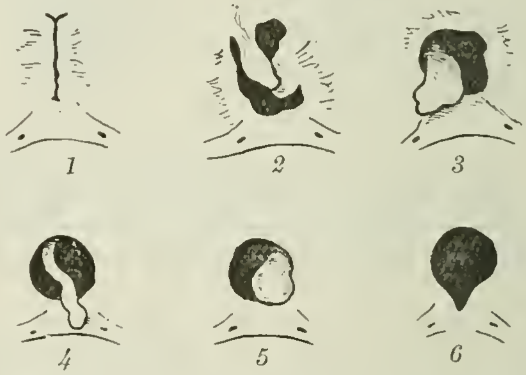


Fig. 74.—Internal meatus after prostatectomy; (1) Lateral folds of mucous membrane closing internal meatus; (2) Flaps of mucous membrane; (3) Adherent flap of prostatic capsule; (4) Strip of prostatic urethra; (5) Adherent nodule of prostate; (6) Flaps removed, and wedge of posterior fold excised.
(*Figs. 72–74 by kind permission of the 'Lancet'.*)

Marchildon[16] holds that uræmia is not an exact diagnosis, and in most cases so diagnosed after prostatectomy pyelonephritis is found at autopsy. Prolonged free suprapubic drainage and treatment of the infection before the removal of the prostate is the best method of treatment.

Bumpus[17] bases a clinical study of *carcinoma of the prostate* on 362 cases observed at the Mayo Clinic. Of these, 24 per cent showed metastasis. Glandular involvement apparently occurs in the terminal stages of the disease, but it may be very extensive without giving rise to physical signs, and cannot be demonstrated until the glands have become sufficiently enlarged to be palpable through the abdominal wall or can be reached by the examining finger in the rectum. Bumpus believes that early involvement of the iliac glands takes place. The author describes two clinical types—a uniform enlargement of moderate size without irregularities or hard areas, and a more common type showing an irregular nodular surface with strong, hard consistences and reaching a large size. Metastasis to bones was found in 41 patients who were x-rayed, and this represents 51 per cent of the 79 patients with metastasis and 30 per cent of the 135 patients who were x-rayed. The pelvis, the spine, and the femur are the most frequent sites. In 8 cases the spinal cord was involved. The smaller type of carcinoma of the prostate gives clinical and microscopical evidence of greater malignancy, while the larger type tends to remain localized, and causes more urinary symptoms. The larger type is more amenable to **Radium** therapy. Pain is absent in 25 per cent, and urinary symptoms in 11·5 per cent of all cases with metastasis. Neuralgic and rheumatic pains in men above middle age, seen in the absence of urinary symptoms, should suggest the possibility of carcinoma of the prostate.

Kretschner[18] discusses 43 cases of *abscess of the prostate* which he places in the following groups: (1) Cases complicating gonorrhœa, urethritis; (2) Metastatic abscess; (3) Abscess following instrumentation; (4) Abscess associated with hypertrophy; (5) Abscess associated with stricture of the urethra; (6) Abscess associated with appendicitis; (7) Abscess associated with stone; (8) Abscess with general sepsis; (9) Abscess of undetermined etiology. The symptoms were frequent micturition, pain, retention of urine, rectal pain, chills, and fever. On rectal examination there was tenderness, and the prostate was enlarged. When the abscess was large, fluctuation could be detected. In early cases there might be some doubt. Four cases went on to resolution, 19 abscesses ruptured into the urethra, 1 alongside the rectum, and 16 cases were operated upon.

The author considers that early operation by perineal drainage is the proper method of treatment.

Strachstein[19] divides cases of *chronic prostatitis* into three groups: (1) Cases devoid of subjective symptoms, where prostatitis is only found during a routine examination. (2) Cases with shreds in the urine, a persistent 'morning drop'. and frequent micturition and vague perineal pain. (3) Cases with no local subjective or objective symptoms, but remote symptoms such as referred pains, usually constant aching in the anus, shoulders, neck, or thighs. Chronic irritation of the urethra and prostate have produced mental changes varying in degree from mild neurasthenia to dementia præcox. Prostatitis may be diagnosed by rectal palpation, but this may discover nothing, and the real test lies in microscopic examination of the suppressed prostatic secretions. "Urethroscopic examination of the posterior urethra does not impart any information of special value." Treatment consists in giving general tonics, and in the removal of causative factors such as stricture. In 30 cases a vaccine was used. While in some cases there was quite a marked improvement from the vaccine, in the long run the results were disappointing. The cases where the colon type of bacillus or the streptococcus was found were always the most resistant to treatment. **Prostatic Massage** properly carried out is the most important method of treatment. It should be done twice a week. The bladder should be moderately filled with **Nitrate of Silver Solution**, which the patient passes after the massage. **Gradual Dilatation,** at first with increasing sizes of sounds, and later with a Kollman dilator, should be used, once in eight or ten days. **Hot Rectal Irrigation** gives gratifying results.

McCaskey[20] uses the **Quartz Ultra-violet Light** in cases of persistent prostatitis due either to the gonococcus or to mixed infection, in cases with prostatic symptoms without objective signs, and also in some cases of impotency. The treatment is given at intervals of from three to five days, and the duration increased from three up to fifteen minutes at a time.

References.—[1]*Brit. Med. Jour.* 1921, i, 376; [2]*Surg. Gynecol. and Obst.* 1921, Jan., 63 (abstr.); [3]*Brit. Med. Jour.* 1921, i, 289; [4]*Surg. Gynecol. and Obst.* 1921, Feb., 179; [5]*Jour. Amer. Med. Assoc.* 1921, Dec. 11, 1617; [6]*N.Y. Med. Jour.* 1921, May 4, 663; [7]*Brit. Med. Jour.* 1921, i, 71; [8]*Boston Med. and Surg. Jour.* 1921, Feb. 10, 140; [9]*Surg. Gynecol. and Obst.* 1920, Nov., 412 (abstr.); [10]*Münch. med. Woch.* 1921, June 17, 727; [11]*Surg. Gynecol. and Obst.* 1920, Nov., 532; [12]*Centralb. f. Chir.* 1921, April 2, 442; [13]*Lancet,* 1921, i, 1008; [14]*Brit. Med. Jour.* 1921, i, 301; [15]*Presse méd.* 1920, Oct. 27, 767; [16]*Amer. Jour. Med. Sci.* 1921, Feb., 243; [17]*Surg. Gynecol. and Obst.* 1921, Jan., 31; [18]*Ibid.* March, 259; [19]*N.Y. Med. Jour.* 1921, May 4, 661; [20]*Ibid.* 647.

PROTEIN THERAPY, NON-SPECIFIC. (*See* Non-specific Protein Therapy.)

PRURITUS ANI.

J. P. Lockhart-Mummery, F.R.C.S.

Saphir[1] describes a number of cases in which pruritus ani appeared to result from *hypertrophied anal papillæ.* These papillæ are the remains of the membrane which in early fœtal life separates the hind-gut from the proctodeum. In a certain proportion of persons one or more of them become hypertrophied. They are then liable to act as an irritant when they get within the grasp of the sphincter. Treatment consists in their removal.

Treatment.—A discussion took place at the Proctological Section of the Royal Society of Medicine on April 13, 1921, on "The Treatment of Pruritus Ani." The discussion was opened by P. Lockhart-Mummery, who advocated the use of lotions rather than ointments where local treatment was indicated. It was pointed out that in early cases of pruritus local treatment was generally successful if thoroughly carried out, but that in old-standing cases local treatment seldom did more than temporarily alleviate the trouble. A local cause was usually present in the first instance, but after the pruritus had existed for some years there was good reason to believe that definite changes took place in the nerve-endings in the skin, which resulted in the persistence of trouble, even after the local lesion had healed. Mummery maintained that in bad cases the best treatment was by Ball's operation and **Division of the Nerves.** He gave the results of 59 cases treated by this method. Whitfield pointed out that *oxyuris vermicularis* was a far commoner cause of puritus ani than was generally supposed. He was opposed to the treatment by **X Rays** for this condition. J. M. H. MacLeod believed that *x* rays were valuable, but agreed that the greatest care was needed to prevent overdosage.

Lotions.—The general opinion was that the best results in cases of pruritus ani are obtained by the use of lotions rather than greasy preparations, and that the first essential of treatment is to keep the parts dry and free from moisture. The following lotions will be found useful in this respect :—

R	Talci		Sol. Acidi Borici 1%	100 parts
	Pulv. Amyli		Glycerini	40 parts
	Liq. Plumbi Subacet. dil.		Aquæ Camphoræ	250 parts
		āā 100 parts		

R	Zinci Oxidi	gr. 20	Glycerini	♏x
	Liq. Plumbi Subacet. dil.	ʒss	Aquam Rosæ	ad ℥j

After the cracks and fissures have healed, it is often advisable to change the lotion for some preparation which, while keeping the parts dry, will also act as a varnish and protect the surface of the skin. The following may be found useful in this connection :—

R	Picis Carbonis	ʒj	Acetone	℥ij
	Benzol	ʒiv		
R	Ichthyol	ʒiiss	Ætheris	℥j
	Alcohol	ʒiij		
R	Friar's Balsam	ʒj	Alcohol	℥j

Needless to say, these preparations must only be used when the skin is unbroken by any sores and cracks.

Ointments.—When ointments are used, they should be made up with a base like pellanthum or as a vanishing cream.

X Rays.—There is no doubt that about 20 per cent of cases of pruritus ani get great relief from *x*-ray application, but the treatment is not free from danger and should be carried out with the greatest care. If the first two applications of the rays do not give complete relief, at any rate temporarily, they should be discontinued ; and in no circumstance should the rays be persisted with for long, as most serious burning is liable to result. Also it must be remembered that there is danger of sterilizing the patient, as it is almost impossible to screen the generative glands completely from the action of the rays, especially in women.

Operation.—The most difficult cases to treat are those in which the itching persists in spite of any treatment, and the cases of paroxysmal pruritus when the irritation comes on suddenly in paroxysms and drives the patient nearly mad. With such patients the best treatment is a **Ball's Operation**—this has been described in a previous issue of the MEDICAL ANNUAL. The operation is not an easy one, as the nerves which it is desired to cut can very easily be missed. When properly done, however, it gives immediate and complete relief, and causes no permanent inconvenience or disability such as destruction of the skin used to do. The end-results are good, and the number of recurrences have been very few. It is free from risk, and is of necessity, since it consists in division of the sensory nerves, free from pain. The normal sensation returns in from one month to six weeks.

REFERENCE.—[1] *N. Y. Med. Jour.* 1921, Jan.

PSORIASIS. (*See also* SKIN DISEASES, GENERAL THERAPEUTICS.)

E. Graham Little, M.D., F.R.C.P.

Unna[1] still holds the view, not largely supported, that psoriasis cannot be differentiated from seborrhœic eczema, and that it is in fact merely the end point of a number of dry scaly conditions, to which diverse names have been given. He regards psoriasis as in no sense a constitutional disorder, and thinks it approximates more and more to the fungoid group. Kobner's phenomenon, the observation that psoriasis is prone to come in the site of a scratch or injury, he compares with the streak culture in agar of a fungus, and draws a further analogy between the spread of a mould on a nutrient medium and the extension of a patch of psoriasis on the skin. He thinks psoriasis is apt to attack regions which are fat-free, and drugs which activate fat secretion are likely to benefit the disease : such drugs are **Chrysarobin** and **Cignolin,** which are excitants of the secretion of oleic acid ; but these applications cannot be made in the vicinity of the eye, for fear of conjunctivitis, and in such cases **Phenol** and **Pyrogallol** are more convenient. A useful formula for a pyrogallol ointment is the following :—

R	Pyrogallol	5 per cent	Salicylic Acid	2 per cent
	Ichthyol	5 per cent		

For the rest of the body, except the hairy parts, the following ointment is recommended :—

R	Cignolin		Salicylic Acid	2
	Ichthyol	āā 5	Ung. Moll.	ad 100

This treatment should be stopped in three to four days, and **Pasta Zinci Sulphurata** substituted. For very rebellious patches the following concentrated ointment may be used :—

R	Cignolin	10	Vaseline	45
	Salicylic Acid	5	Wool Fat	40

Or, if pyrogallol has been found effective, ointments containing this may be used, the patients being carefully watched, and the drug stopped if intoxication is evident. The administration of acids may help to prevent such intoxications, dilute hydrochloric acid being one of the best. The head is one of the most resistant sites for psoriasis, and in this region one may use :—

R	White Precipitate Ointment		Salicylic Acid	2
	Sulphur Ointment	āā 24		

Small[2] contributes an interesting note on the part played by injury of the skin in determining the incidence of psoriasis. He found it in two classes of case : following scabies and impetigo ; and in relation with gunshot wounds. (*Plate XXXI.*)

Mook,[3] from his experience in France, recommends the following treatment of extensive cases of psoriasis. For the scalp, hands, and face, where chrysarobin is inadvisable, an ointment consisting of 5 per cent **Salicylic Acid** and 5 per cent **Hydrarg. Ammon.** in vaseline is recommended, rubbed in daily. For the body a combination of 2 per cent **Phenol**, 10 per cent **Chrysarobin**, made up with white vaseline, should be rubbed into the skin affected, the parts between being anointed with a protective ointment :—

R	Ichthyol	1	Zinc Oxide	6
	Corn Starch	6	Vaseline	to 100

After application of these two ointments the whole body is to be dusted with corn starch or talc powder, and the patient recommended to keep quiet, but not to stay in bed.

REFERENCES.—[1] *Wien. klin. Woch.* 1921, June 9, 275 ; [2] *Edin. Med. Jour.* 1921, June, 51 ; [3] *Arch. of Dermatol. and Syph.* 1920, Oct., 447.

PSOROSPERMOSIS. (*See* DARIER'S DISEASE.)

PSYCHOLOGICAL MEDICINE.

J. A. Hadfield, M.A., M.B., Ch.B.

CRITICISM OF PSYCHO-ANALYTIC CONCEPTIONS.

Looking over the literature of the year on psychological medicine, one is struck with the fact that the conceptions of the new psychology, like that of repression, and the unconscious, have been submitted to searching criticism. This is to be expected. The new psychology was flung into an astonished world by Freud, not merely as isolated ideas, but as an organized system of psychopathology. For years the Freudian psychology remained without adequate criticism, with the result that it was either swallowed wholesale—frequently by people for whom Freud's *Interpretations of Dreams* was their first introduction to psychology—or rejected as an unpalatable bolus by disgusted and often prejudiced readers. Hardly had we recovered from the first shock of Freudianism when we were smitten on the other cheek by Jung

PLATE XXXI.

PSORIASIS

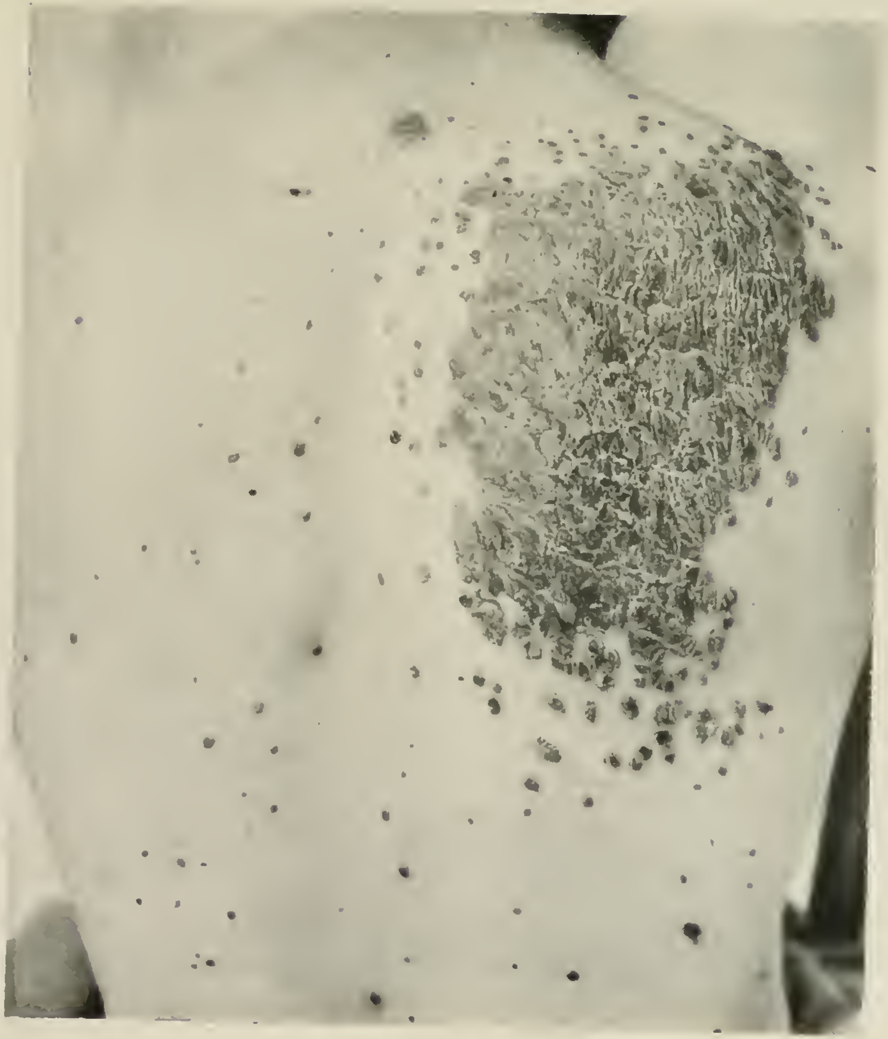


Fig. A.—Psoriasis following gunshot wound of back.

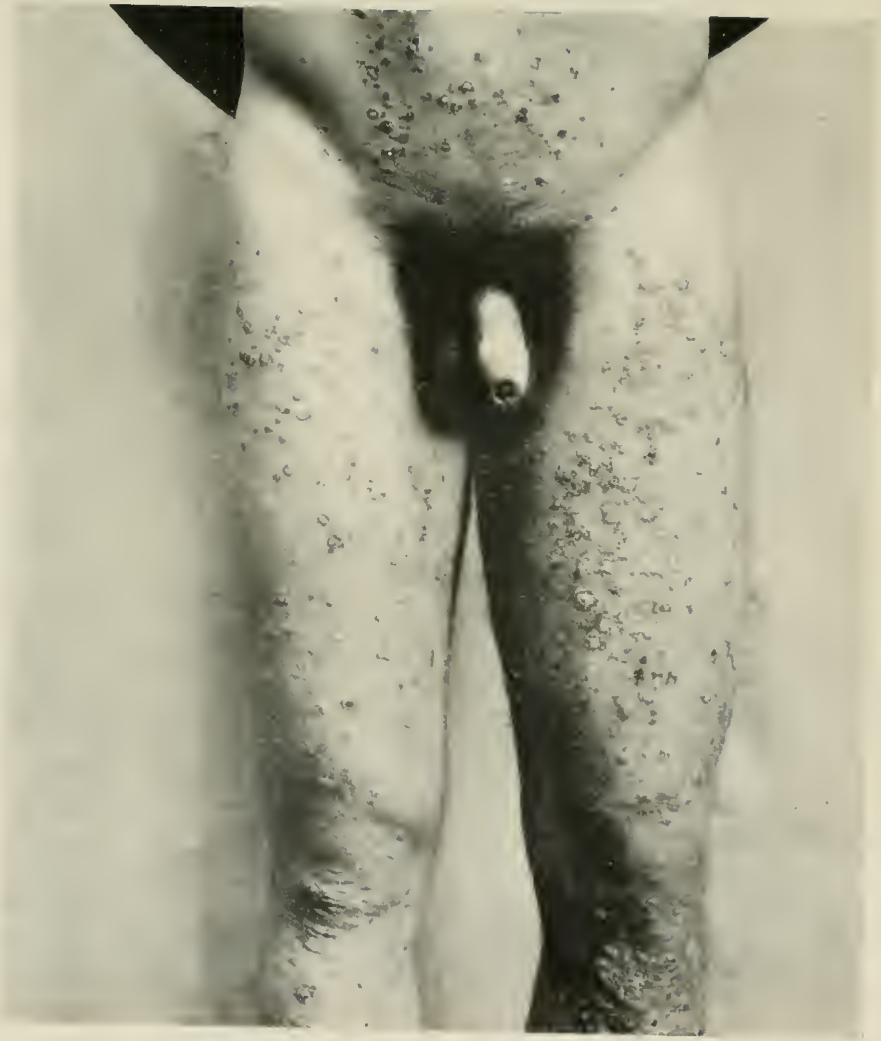


Fig. B.—Psoriasis following and taking on the distribution of scabies.

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with another elaborate, and no less valuable, system of psychopathology. For some years a number of workers, mostly practising physicians, have applied these systems to the treatment of disease, and the results of their treatment fully justify the claim of the new psychology to a place amongst the recognized methods of treatment. The criticism of the new psychology which at present characterizes the thought and writings on the subject is therefore not so much directed towards the therapeutic value of its application, which is now generally admitted, but is aimed more at its concepts by those whose interest is scientific rather than therapeutic, and who, accepting their practical value, seek to understand them better by a clearer definition of their meaning.

The Unconscious.—It is a curious fact that whilst many devotees of the 'new psychology' scoff at the teachings of 'academic psychology' as old-fashioned and discarded, they have themselves founded important doctrines upon conceptions long since discarded by normal psychologists. One of the main problems is concerned with the conception of the unconscious, and the difficulty lies in the discovery of a formula that will do justice to all the mental functions which are contained in this conception, without doing violence to other accepted conceptions of psychology. If we ask ourselves what it is that is repressed, or, otherwise, what is the content of the unconscious, we are answered by the Freudians that we repress infantile sexual desires, which therefore constitute the unconscious; and by the Swiss school that the unconscious consists of primitive thought feelings; thus Jung's "collective unconscious" consists of "primordial thought feelings: not only every beautiful and great thought and feeling of humanity, but also every deed of shame and devilry of which human beings have ever been capable."

Both these assumptions seem to imply a theory once held but long since discarded by psychologists, *that ideas can be stored in the mind*, and that memory consists in bringing up these ideas from the cellar of our minds. The idea that the mind is a storehouse of all our experiences, and that out of that storehouse these could emerge like fish from the depth of the ocean, served as an excellent illustration to popularize psychological conceptions, but receives no support from psychologists. Ideas are not stored up or retained as such: *what is retained is not the idea, wish, or thought, but only the conditions of their revival.* This was well illustrated by Lloyd Morgan at the British Association by an analogy from plant life. A flower, say a tulip, bursts from a bulb this spring, and again next spring. In the meantime the flower *as such* has not entered into or been retained in the bulb; only the conditions of its revival have been so retained. So the thoughts and wishes that were once in consciousness, whether as infantile 'wishes' of the individual or 'thought feelings' of the primitive mind, are not retained as such: all that is retained is the conditions of their revival. The pianola record, a sheet of perforated paper, is not music or anything like music, although for practical purposes we may say that the 'music' is in the cupboard when we mean only the records, as we may say that ideas are stored in the mind. The music only exists when it is actually being played; only the condition of its revival, the record, is retained, by the excitation of which the music may be at any future time reproduced. We can no more have unconscious ideas than we can have silent music.

When an impulse of any kind has once been expressed, whether in childhood or in the race, there are retained the conditions of its more facile revival, and it is these conditions or records, whether we conceive of them as mental or as physiological, which constitute the unconscious. This is most obviously the case with the instincts, which are not retained as such, but only as psychophysical dispositions which when stimulated lead to an expression of the instinct. An instinct, like an idea, does not exist except in its expression.

To say, therefore, that the unconscious consists of 'thought feelings' or of 'wishes' is to return to the discarded cellar or storehouse theory. The unconscious has no 'content': it consists only in a certain physiological structure or mental condition which makes possible the revival of ideas and feelings once conscious in the individual or in the race. Whether these conditions are of a psychological or a physiological character it is impossible to say; but whatever they are, their pattern must be exquisitely delicate.

Such a conception as this is more in keeping with biological as well as psychological ideas, though it robs the conception of the unconscious of none of its practical qualities, but only of its mystery, its terror, and its capital U. What we *have* learned from the new psychology is that these conditions when aroused give rise much more easily than we thought to definite conative tendencies which influence our action, and motivate our behaviour in ways that we did not suspect.

If what we retain in the unconscious is merely the condition of revival of mental expression and ideas, it will be necessary also to revise our conceptions of *repression.* Obviously we do not repress ideas and feelings into the unconscious, although we may be said to inhibit their revival; for both ideas and feelings are subjective mental experiences which do not exist except when actually in function, nor can they be stored, either by repression or otherwise. When the conditions of an idea have once been formed, renewed stimuli may easily arouse them again to activity. We repress the idea or complex when we refuse to permit it to be stimulated and thus revived, when we refuse to permit it to come into existence again. We repress when we prevent a desire from being aroused.

A good deal of confusion in the use of the term unconscious has further arisen as the result of using the term 'unconscious' when we mean that a mental process is not self-conscious.

This leads us to a more precise definition of what is implied in the word 'conscious'. In actions such as driving a car, we are often said to be unconscious of what we are conscious but not self-conscious, and as a result of this confusion the unconscious is credited with many wishes and thoughts and motives to which it is not entitled. Höffding describes 'unconscious' ideas as ideas which we have but do not know we have. We avoid obstacles in walking without knowing that we do—we must be conscious of them to avoid them, yet we may be said to be 'unconscious' of them. This confusion of terms is due to the fact that we use the term unconscious when we mean that we are not self-conscious. We are conscious of the obstacle, but not self-conscious of it; that is, we are conscious of it but do not know that we are. Thus 'unconsciousness' may mean the lack of consciousness; or by 'unconscious' we may mean the absence of *self*-consciousness, and use the term to indicate that there are ideas which are conscious, but not self-conscious, or in 'full' consciousness. The term consciousness implies a condition of awareness, and is not to be limited to that of which we are aware that we are aware.

In psychopathology we have sexual desires, but do not recognize them as desires, but may only recognize our fear of these desires: we fear, and know that we fear—we are self-conscious of our fear: we have desires, and desires like ideas must in the nature of things be conscious, but at the time do not recognize them; we are not self-conscious of them. But in looking back or by analysis we recognize that the desires were there, and consciously, all the time. "Yes", we say, "I really desired all the time, but did not recognize that I did." They are not unconscious desires though repressed. Repression of this kind is refusal to *recognize* the desire. A desire may be perfectly conscious although I may not have any knowledge of having the desire.

An 'unconscious wish' is merely an 'unrecognized' wish. It is said that it is a matter of indifference whether we speak of 'wish' as of what is in the unconscious, or use terms such as 'conative tendency' or 'impulse'. But this is not a matter of indifference, for the latter terms do not imply consciousness, and are therefore not so inconsistent with the modern view of what is retained, whereas the term 'wish', however we try to disguise the fact, carries with it the distinct connotation of a *conscious* tendency towards an end, and therefore cannot be unconscious. A 'wish' can no more be retained than a 'thought feeling', though under suitable conditions they may be revived.

Two uses of the phrase 'unconscious' need therefore to be distinguished: (1) The 'unconscious' which is a *retained condition* of the revival of individual or racial ideas and feelings. Such a condition is of the nature of mental structure, and is just as devoid of consciousness as a pianola record is innocent of music. (2) The unconscious may mean that which is really conscious but which is not *self*-conscious, and therefore that of which we do not know that we are conscious, such as 'unconscious' motives. These are not, properly speaking, unconscious.

These facts McDougall puts otherwise when he states that the unconscious is commonly used to denote facts of two distinct orders: (1) The facts of mental structure (the 'conditions of revival' of which we have written); (2) Mental activity of which the subject is not clearly conscious (or, as we have put it, of which he is not conscious that he is conscious).

The Censor.—The term 'censor' has so often been criticized that it is hardly necessary for us to add our voice to the rest: it has no scientific, though it has a popular, justification. But it represents a fact of mental process, and Rivers,[1] while criticizing the term itself, has recognized the fact in defining the 'censor' as the inhibition or control of one level of the mental hierarchy over another, just as each level of the nervous system controls the one beneath. Thus one stage is representative of our childhood experiences, another of youth, another of manhood, each phase being normally controlled by the phase above, and expressing itself in language proper to itself when that control is removed, as it is in dreams.

The New Psycho-analytic Theories of Kempf.—The modern schools of Freud and Jung are frankly psychological in their approach to the neuroses, although Freud holds out the hope that a physical basis will ultimately be found. Adler tries to bridge the gulf between mind and body in his theory that the neuroses are due to organic inferiority. Kempf, whose theory goes beyond a mere criticism of the psychological schools, and seeks to build up a constructive system, frankly maintains that our consciousness and thoughts are largely determined by the tone and tension produced by the autonomic apparatus in the muscles which move our body and limbs. 'We think with our muscles.' Most of the nervous tensions originating in the autonomic apparatus have as their biological aim the acquisition of appropriate pleasant stimulations and the avoidance of destructive unpleasant ones. Upon such a physiological basis Kempf formulates a new theory of psycho-analysis, excellent summaries of which are contained in articles by André Tridon[2] and Carver.[3]

Kempf maintains that the '*wish*' (the unit of psychological process) of Freud may be completely accounted for if it is recognized as none other than a localized autonomic affective craving which compels the organism to such behaviour as shall satisfy the craving. Thus the source of the wish is peripheral: it is to be discovered in the autonomic system.

The conception of '*conflict*', which to the Freudians is the conflict between the repressed sexual wish and the inhibitions of convention, Kempf interprets as the struggle between physiological cravings of various sections of the autonomic nervous system. The sexual segment may be conditioned by new stimuli that are perverse or tabooed, and until gratified may cause irritability and depression ; whereas their unrestrained indulgence may greatly jeopardize the love of social esteem and the feeling of social fitness. The secret sense of social inferiority, due to awareness of tabooed pelvic cravings, makes life in human society a fearful ordeal.

'*Repression*' is thus explained : " When a craving is allowed to make the organism aware of its needs, but is not allowed to cause overt acts, it is said to be suppressed. When it is not allowed to cause the organism to become aware of its needs, it may be said to have been repressed ; but neither suppression nor repression is synonymous with annihilation." That such conflicts and repressions take place between impulses, the strongest of which conquers, has long been familiar to psychologists. But these have nevertheless held that there is another factor which determines that it is not necessarily the strongest impulse that wins—namely, the synthesis of the self or personality which acts as a whole by its function the will. The conceptions of the self and will make the conflict something more than a struggle of impulses or of the supremacy of one segment of the autonomic system over another. Nor does Kempf solve the question of the nature of consciousness ; he merely affirms that it arises as the result of physiological tension.

Neurosis is due to the fact that one segment of the autonomic system makes the whole organism subservient to it.

Psycho-analysis Criticized from a Physiological Standpoint.—Criticism in this direction comes from the French School. In an article on " Les réactions du système nerveux viscéral dans les états anxieux ", Euxière and Bargarot[4] discuss the physiological accompaniments of *angoisse* which may originate physiologically or psychically, and find them to be caused by over-stimulation of the sympathetic nervous system. In the later phases there takes place a compensatory activity of the vagal system, with the disappearance of the *angoisse*. These authors suggest that the *angoisse* with the resultant anxiety states should be treated in the direction of lowering sympathetic activity. It will be interesting to observe whether such organotherapy is followed by as good results as psychotherapy, for it cannot be said that the treatment by bromides is the most that organic treatment can do.

PSYCHOLOGY IN THE MEDICAL CURRICULUM.

Such considerations as the psychological fallacies at the base of the several important conceptions of modern psychopathology raise the question as to the necessity of training in psychology of the medical practitioner. If we believe there is such a thing as mind and mental processes we must believe that these may become disordered, and if they are disordered we must necessarily study not only their psychopathology but their psychophysiology or normal psychology. Lloyd Morgan[5] advocates " a specialist to lecture to specialists " on this subject. " Just as there is one science of chemistry which may be applied to metallurgy or to brewing or to soap-boiling, and the fundamental principles of this science should be taught by a chemist, so also there should be one science of psychology, which may be applied in teaching, in advertising, or in psycho-analysis, and the fundamental principles of this science should be taught by a psychologist." " What is needed by those who deal with such matters in the practice of their profession is a *true* psychology whether it be new or old." He regards the 'new' psychology in the light of a psychological embryology, elucidating those factors in the unconscious out of which spring our thoughts and feelings. This course has been followed in the curriculum of the various diplomas in psychological medicine. Whether psychology should be introduced as a subject in the medical curriculum is a debatable question. The usual answer is that there is not time, which means that it is not considered important enough.

More important, however, than a special three months' course for the student is the attitude of the teaching staff in our hospitals in the ordinary course of clinical treatment. "The student," says Farquhar Buzzard,[6] "should learn from any and all of his medical teachers how to recognize, how to investigate, and the broad principles of treating cases of mental disorder." "Patients suffering from minor mental maladies will form the bulk of his practice when he is qualified."

A right attitude on the part of the teaching staff towards the psychoneuroses would help to prevent the development of many a neurosis (as well as to avoid many other neuroses due to medical suggestion, which form a large percentage of ordinary cases). Carhill[7] illustrates this in an article on "Manifestation of Hysteria": "I have heard of a case of hysterical paraplegia following lumbar puncture, and I have seen severe palsy of the upper limb after vaccination and also after a subcutaneous injection of antitoxin over the deltoid. It is my custom to make a patient demonstrate the absence of hysterical sequelæ at once after every operation with a hypodermic needle, intrathecal needle, and the like!" Carhill quotes a maid who had managed to get a needle beneath the skin of her palm, and cried, "Oh! it *is* sore, and I can't move any of my fingers." Here was the making of a functional paralysis of the hand, which prompt treatment prevented from becoming permanent. Every psychotherapist is constantly confronted with patients whose symptoms are directly due either to direct medical suggestion from the doctor, or to the persistence of suggestions that could easily have been cut short by the physician or surgeon.

THE PRINCIPLE OF ENDOPSYCHISM.

It is inevitable and necessary that attempts should be made to harmonize the psychological attitude towards the psychoneuroses with biological and physiological conceptions. But it must be remembered that the psychologist's attitude towards these problems differs from that of the biologist. It is commonly said that the neuroses are due to failure in adaptation to environment. While this is true biologically, it is not true psychologically. The neurotic's illness is really due to failure to adapt himself to *himself*. The soldier's neurosis is not due to the conflict between himself and the conditions of shell fire; if he merely had, as the biologist says, to adapt himself to this environment, he could do so by running away; but something within him prevents his doing so. He fears the shell, but he fears something more than death by shell fire, namely, his own cowardice. The conflict here as everywhere is endopsychic, that is, it is between factors both of which are within the mind itself. The neurosis said to be due to a sexual trauma is in reality due to an endopsychic conflict between the sense of horror and the sexual desire aroused by the trauma. The psychologist, therefore, who reduces all the events and occurrences of the objective world into terms of mental processes, discards the old idea that a breakdown can be due to a 'shock', but regards it as always due to an endopsychic conflict between the dominant psychology and a repressed complex of fear, sexual desire, or ambition aroused by the shocking event. This is not a mere academic distinction, for it means that in analyzing the condition we need to reproduce not only the forgotten event, with its emotional content, but both the antagonistic emotions which constitute the conflict.

Failure to appreciate this accounts for the fact that so many patients are greatly benefited but not completely cured. A lady's self-consciousness may seem obviously due to the fact that she had to wear irons on her legs for several years at school. The reproduction of all this sense of humiliation relieves her: but she is not cured until it is discovered that she was rendered over-sensitive to such experiences owing to previous phantasies of being excessively charming and beautiful. This phantasy until now has continued to dominate her psychology without her recognizing it. The conflict at the root of the neurosis was between this *phantasy* she had of herself and the true *conception* of herself as a person of very ordinary charm.

SLEEP AND INSOMNIA.

This is a subject of great importance to the general practitioner, and one that is complicated by the fact that the most simple remedy, the use of drugs, is fraught with the danger of drug addiction. Moreover, treatment by drugs is 'a reproach to therapeutics', inasmuch as it fails to deal with first causes. Articles have appeared by R. G. Gordon[8] and Prignano[9] on this subject. The use of hypnosis seems the most natural remedy, but, curiously enough, while some cases do very well with this, one frequently finds that cases of insomnia are the most resistive to hypnosis, and it is by no means a certain cure. The method of fatiguing a patient with the advice that he should 'tire himself out' also seems promising, since we associate sleep with fatigue, but it often results in greater distress of mind by adding the sense of fatigue to the insomnia. Another tenet of the 'tire yourself out' school is that one must not sleep during the day, lest this should prevent sleep at night. It might be asked what matters it when we sleep as long as we do sleep and rest; indeed with 'insomniacs' we usually find that a sleep during the day induces rather than inhibits sleep at night by quietening down the nervous and mental processes. The fatigue treatment proceeds on the false assumption that sleep is due to fatigue, whereas Gordon insists that this is but one inducement to sleep, a sleep different from normal sleep in that the latter is not the result of fatigue but on the contrary is intended to save us from fatigue.

He describes sleep as the withdrawal of vital energy from higher levels. This description may be accepted if it finds a place for *voluntary* withdrawal of vitality in sleep, for there are many people who can go to sleep at will even when fresh. No theory of sleep will serve which does not explain this fact, and the corresponding fact that people can be hypnotized into sleep immediately from a fully waking state.

A common form of insomnia is exhibited in the patient who wakens at a special hour each night. This is a habit, but beneath every habit lies a repression. Analytic investigation always demonstrates that this habit of waking, say at 3 o'clock, dates back to some forgotten event occurring at that time—e.g., the time when a patient discovered he had dysentery in the Dardanelles. These 'clock' neuroses leading to insomnia are of the same nature as that of the man who gets a headache at noon every day; or of the other whose indigestion is always severe on a Friday irrespective of diet. The actual time forms the most valuable clue to the emotional cause of the insomnia.

The play of emotion is also of the greatest importance in sleep and insomnia. Patients who *show* their emotion in weeping or anger, may sleep long and deeply; for example, a business man with thousands of men under his control whose breakdown was characterized by excessive emotionalism, could nevertheless sleep a dreamless sleep at any time of the day or night. Insomniacs may be divided into two clinical classes: those who are nervous and emotional and cannot sleep because their nights are obsessed with anxious thoughts; and those who are emotionless and tired, a condition we are apt to look upon as a result of sleeplessness, but which is rather connected with its cause. Whereas the former class are suffering from emotional anxiety, the latter are suffering from repression of emotion, and they dare not sleep because sleep means the withdrawing of the repressing force and the emergence of terrifying fears or repugnant thoughts. The former, whose anxieties are frequently connected with worrying thoughts of the day, are those in whom sleep can be induced by the quiescence produced by hypnotism, and by the many methods of monotony advocated in the lay press. The emotionless type find these methods worthless, for they are in this position : to sleep they must relax attention and cease watching ; but as soon as they do that, up comes the repressed emotion and wakens them ; thus, on the verge of sleep, they are constantly wakened with a start. For instance, a lady of moral character dreads the masturbation which sometimes occurs in sleep, and dares not relax her vigil for fear of it. It is only when day dawns and the terror of the repressed emotions is less severe that such patients can venture on sleep. The patient who sleeps lightly is of the type who has repressed emotions in the presence of which he dare not sleep deeply. The only adequate treatment in these cases is to recover the repressed emotion by some form of analysis.

It is to be remembered, however, that the question of sleeping does not solve the whole problem of rest ; for the poor quality of the sleep may make it of little worth. One of the characteristics of the neurasthenic proper is that he may sleep eight or nine hours, but wakens more tired in the morning than when he went to bed at night. As the day progresses he gets brighter, until he is again at his best when bedtime comes. This may be due to two causes : (1) That during sleep his mind is active and seething with its latent problems, though these may not be remembered as dreams ; (2) It may also be due to the reluctance of the neurasthenic to face problems and difficulties of the day. It has long been observed that the more varied the mental equipment and the greater the intellectual capacity, the less sleep we need (Bruce). We should consider it more accurate to state it thus, that the greater our *interest in life* the less sleep we need (for interest does not necessarily go with mental equipment or intellectual capacity) ; it is interest, as at holiday time, which induces us to leave our beds without reluctance, to anticipate the joys of the day. It is just this joyful anticipation that the neurasthenic cannot experience.

SUGGESTION.

New life has been given to treatment by suggestion by the publication of Baudouin's *Suggestion and Autosuggestion*, which describes the principles and work of the New Nancy School under Coué. The main emphasis of this work is upon *auto*suggestion carried out by the patient with some such repeated formula as "In all respects I am getting better day by day." The 'special respects', whether pain, paralysis, or mental disturbance, are at first considered in detail by the patient, but thereafter the simple formula is sufficient. The main contribution of the New Nancy School is that it throws the onus of cure on the patient by insisting on autosuggestion.

The New Nancy School, like Babinski, regard the neuroses as due to suggestion. This is not as contradictory to psycho-analytic principles as might at first appear, for *suggestions may arise from the repressed complexes* within the psyche, and not only from without. Thus, to give a simple example, the fear that the soldier represses may directly give rise to the suggestion that he cannot go on but is paralyzed ; repressed infantile wishes may make themselves felt as suggestions of hysterical symptoms ; the craving for sympathy of a woman suggests to her that she has a pain in the back, the choice of symptom in each case being suggested by some accidental circumstance or temporary organic trouble of the moment. Complexes are the most fruitful of all sources of suggestion. Treatment of this condition may be either by suppressing the voice of the complex by a counter autosuggestion (and the success of this depends on the vigour and persistence of this counter suggestion), or by bringing up the complex into the light of consciousness and submitting it to reasoned criticism. The former is the method employed by the suggestionists, the latter by the analytic school.

The weakness of autosuggestion as a method of cure is due to the fact that there is a fight between two autosuggestions, one from the original complex, the other from the new therapeutic suggestion, which frequently fails to dislodge the older and more established suggestion.

As to the ultimate nature of suggestibility, it will be remembered that Ferenzi describes suggestion as being due to the persistence of the attitude assumed towards father and mother in childhood: we are suggestible to authority as we were in childhood to the father; to all affection as we were to the mother. Thus to the Freudian 'suggestion' is akin to 'transference' to the parent or to the doctor, and they reject treatment by suggestion on this ground. William Brown[10] opposed this view of suggestion on the ground that children illustrate the enormous potency of suggestion in the first few days of life, independent of transference. A broader view of the origin of suggestibility is that given by McDougall, who considers it a manifestation of the instinct of submission. Ferenzi and Jones regard it as due to masochistic tendencies; but since McDougall holds that masochism is a perversion of the instinct of submission, the views are not as remote as they may seem to be.

It will be remembered that McDougall originally defined suggestion as a "process of communication resulting in the acceptance with conviction of the communicated proposition in the absence of logically adequate grounds for its acceptance." The criticism of the latter part of the definition was pointed out by the present writer in the discussion following a paper by Hart, and was later, and independently, brought forward by Prideaux, that an idea may be suggested although logical grounds for its acceptance may not be actually absent. There may be good logical grounds for accepting a suggestion—for instance, the suggestion to a hysterical patient that he will regain the use of his paralyzed limbs. But if those logical grounds do not play a part in the acceptance of the idea, then it is a suggestion; in other words, the idea is accepted without being submitted to the critical judgement. This criticism McDougall[11] has now accepted, and has amended his definition to read: "Suggestion is a process of communication resulting in the acceptance with conviction of the communicated proposition *independently of the subject's appreciation* of any logically adequate ground for its acceptance."

The whole nature of suggestibility depends in our opinion on that factor of *criticism*, and this should be made the test of whether a mental communication, either from without or within, can be regarded as a suggestion. Suggestion, we have held, is the process by which ideas are introduced into the mind without being submitted to the critical judgement; or, if objection is taken to the last phrase as being too philosophical, we may put it otherwise—without being brought into association with, and therefore modified by, mental processes which already dominate consciousness.

Further, the phrase 'logically adequate ground for its acceptance' lacks precision: what are we to regard as 'adequate' grounds? It may be adequate ground for me that a certain authority, my church or my political party, says so, and logically adequate in that I consider that they know better than I do what is right; yet it would nevertheless be a suggestion, and one of a very common type, the suggestion of authority. On the other hand, what are we to say of a man who, spurning all logic and the argument of his friends, goes and gets drunk? It is apart from 'logically adequate grounds', but we do not call it a suggestion, if by suggestion we mean, as McDougall does, heterosuggestion. But if we accept the factor of criticism as the test of a suggestion, the suggestion of authority is true suggestion, in that I accept it without criticism; and the drunkard, who, in spite of all appeal and his own common sense, is impelled to get drunk, is dominated by an autosuggestion from some repressed complex, which compels him to do what is contrary to his own best judgement.

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PSYCHOSES. (*See* Mental Disease.)

PYELITIS IN INFANCY AND CHILDHOOD.

Frederick Langmead, M.D., F.R.C.P.

Many measures have been employed in this disease with varying degrees of success. H. L. Kretschmer and H. F. Helmholz[1] write of pelvic lavage with **Silver Nitrate.** This form of treatment has been used in adults; but a lack of appreciation that it is possible in early life, and the need for a general anæsthetic, probably explain the fact that hitherto internal treatment and vaccine therapy have been the methods employed in young children and infants. Their paper is based on 11 cases, the youngest patient in the series being seven months old, the oldest ten and a half years; all were girls. **X-ray** examinations were an important preliminary to treatment, and in this way several cases of pyelitis were shown to be due to calculi, and a useless course of pelvic lavage thereby avoided. To exclude tuberculosis, routine examination of the urine for tubercle bacilli was done, including guinea-pig inoculations from urine obtained from each kidney and bladder. The object of the treatment was to render the urine sterile and free from pus, and no case was considered cured unless these requirements were fulfilled. They rightly emphasize the distinction between this result and symptomatic cures, which are far easier of attainment, and disagree with those who consider an abiding infection of little importance. In 9 of the 11 cases complete cures were obtained. One patient left their observation after the first lavage. The strength of silver nitrate employed was 0·5 per cent, 1 c.c. of which was injected in infants, and up to 5 c.c. in the older children. The number of injections varied: 3 patients required but one injection, 5 required two, and 1 three. In 2 cases the kidney urines were sterile before that in the bladder, an event which has been noted several times in adults, in some of whom it was associated with relapses and recurrences of the pyelitis. In 10 of the 11 cases *B. coli communis* was found in pure culture; the other was an example of *B. paratyphosus* infection. In every case the infection was bilateral, and in no case was the bladder alone affected. It is important to note that though this series is short, it consisted of cases which had proved intractable to other forms of treatment. There were no untoward results.

Zerbino[2] has treated cases with success by rectal injection twice daily of 150 c.c. of a 1-3000 solution of **Methylene Blue.** This drug, he says, has a pronounced bactericidal action on the peccant organisms in these cases, and when injected into the intestine follows the same route and is eliminated easily and rapidly by the kidneys.

References.—[1]*Jour. Amer. Med. Assoc.* 1920, Nov. 13, 1303; [2]*Rev. Med. del Uruguay,* 1920, Nov. (abstr. in *Jour. Amer. Med. Assoc.* 1921, Feb. 12, 485).

PYLORIC STENOSIS, CONGENITAL. (*See* STOMACH, SURGERY OF.)

RADIOTHERAPY. (*See also* ELECTROTHERAPEUTICS *and* X-RAY DIAGNOSIS.)

C. Thurstan Holland, M.R.C.S.

Malignant Disease and the Erlangen Technique.—The outstanding feature of radiology during the past year has been the considerable advance in the technique of the *x*-ray treatment of malignant disease, and this is primarily due to the Erlangen school and to Drs. Seitz and Wintz. For many years radiologists in this country and abroad have been asking for more powerful generating apparatus, and with it tubes able to stand up to large currents of high intensity and penetration—tubes capable of carrying currents of several milliampères backing up a spark-gap of anything above 10 inches. Many difficulties have stood in the way. Generating apparatus showed a tendency to break down when used for any length of time under these conditions, and in many respects the ordinary types of both Coolidge and gas tubes were inefficient.

Gilbert Scott[1] has published a preliminary communication on a method of deep therapy which he devised chiefly in view of the large number of cases of *mammary cancer* in which, despite the disappearance of the local manifestations of the disease, metastases in the thorax and elsewhere appeared to be uncontrolled. His method is based upon an endeavour to fulfil two conditions: (1) To administer a lethal dose of *x* rays to the pathological cells lying at various depths and in unknown positions; (2) To irradiate very large areas at the same time. He uses two Coolidge-tube-coil installations together, one on each side of the patient, and gives maximum doses to the whole thorax from both sides, and from the front and back, at a single sitting. This duplex method he describes as an elaborated method of cross-firing, differing, however, in two essentials from previous methods in that (1) both tubes are working at the same time from both sides of the body, and (2) a very large area is covered —a far larger one than has hitherto been attempted. It is suggested that the administration at the same time of large doses of highly penetrating rays in opposite directions may have a more powerful effect on cancer cells than when each dose follows the other. Professor Wintz's method, however, goes much further. He has elaborated instrumentation so that two *x*-ray coils are mounted with their primaries and secondaries symmetrically connected, and with the addition of ingenious devices he obtains a very high voltage—up to 230,000—and this produces a very hard and nearly homogeneous stream of *x* rays. The *x*-ray tube is a water-cooled gas tube in which the water in the cooling chamber is kept at boiling point: this means that the temperature of the anticathode is not altered during use, and therefore the vacuum is kept stable; additionally the tube is fitted with an osmo-regulator automatically controlled. The claim is made, and this is the essential on which the method must stand or fall, that by means of this apparatus, working at a 16-in. spark-gap and with 2 to 2·5 ma. going through the tube, with correct filtration—$\frac{1}{2}$ mm. of zinc—a practically homogeneous stream of *x* rays is obtained: that *a measured dose of this x-ray stream administered to cancer cells will definitely kill them.* Further, the claim is made that this definite dose has been established experimentally, and that anything short of this dose—which *must* be administered at a single sitting—is useless, and indeed dangerous, as the smaller dose acts as a stimulant to the cells instead of a destructive agent.

This method has, most unfortunately, been advertised in the public press as a new method for the cure of cancer, and authoritative statements have been made through the same medium that 80 per cent of cancer cases initially treated will be cured, and that the results obtained are far superior to anything which can result from surgery. Admitting that in both instrumentation and methods it marks a pronounced advance in x-ray therapy, it is hard to believe that the same dose of radiation administered to all forms of malignant disease will effect the same result; and even provided that all that has been reported is approximately true, sufficient time has not yet elapsed for the substantiation of such sweeping claims.

Béclère[2] gives a good account of the Erlangen technique, and compares it with the method of treatment by means of x rays and radium combined. This paper is illustrated, and describes the dangers, the therapeutic results, and the difficulties of the technique. In discussing the treatment of *cancer of the uterus*, the author considers that the combined action of radium and x rays is the best; and without accepting in its entirety the work and conclusions of Seitz and Wintz, work which he believes in no sense to be the final word, he expresses the opinion that it marks an important step forward on the way to victory over cancer of the uterus. Heinmann,[3] Professor of Clinical Gynæcology at the University of Breslau, publishes some early statistics on the treatment of cases of uterine cancer after adopting, but to some extent modifying, the methods of Seitz and Wintz.

Two American radiologists have adopted this newer technique in a modified form, using the apparatus they already possessed. Sittenfield[4] reports very favourably on the immediate results in cases of cancer of cervix and breast, but recognizes that nothing can at present be said as regards the end-results. To the cervix case he gave two hours' exposures daily for four consecutive days, filtering with ½ mm. of zinc, the focal distance being 50 cm. He introduced 50 mgrm. of radium element into the cervix at the same time, and left it there for fifty hours. The reaction was not so severe as those seen in Germany where the entire treatment was given in one day; and as the immediate result was an entirely fibrosed cervix, with the patient free from all clinical manifestations of the disease, it would appear that the claim that the entire treatment must be given at one sitting is not justified. Pfahler[5] also adapted his apparatus to meet the modern conditions. His present technique is 5 ma. at 126,000 volts, filtering through 10 mm. of glass or aluminium at a focal skin distance of 30 cm. An erythema dose is given in from 40 to 50 minutes. He makes a point regarding the care in filtration which is necessary in view of the dire results which would follow any mistake, and insists that for every deep application two people must verify the filter. A further interesting point is the author's report on the relative value of filters: he lays down the law that increased filtration, with increased focal skin distance, will increase the value of deep radiation as compared with the surface effect.

Protection of X-ray and Radium Workers.—Following closely upon these advances in deep therapy, and probably as a direct result of the use of tubes giving off highly penetrating rays in large quantities, it has been recognized that previous methods in general use for the protection of operators, to say nothing of patients, have become more or less obsolete and quite inadequate. Perhaps the occurrence which emphasized this in no uncertain manner was the death of one of the most prominent of British radiographers, Dr. Ironside Bruce, a man who had done not a little for the advancement of radiology during the times when his pioneer work was of the most valuable description. Under the title of a "Case of Acute Plastic Anæmia", a full account, with striking details, is published by Larkins.[6] An accidental blood-count at the beginning of the illness showed reds 4,200,000, whites 7200, Hb 85 per cent; in five months, and just before the end, the count was reds 1,005,000, whites 840, Hb 18 per cent. There seemed to be no other possible cause for the onset of this case than *x* rays, and it followed upon a change over from soft tubes to very hard ones. It should be noted that the differential leucocyte count corresponds exactly to Pinch's two cases of a similar nature due to the effects of radium, and these cases ran an almost identical course.

That the danger of the older methods has been fully appreciated is shown by the formation of a committee representing various radiological and other scientific bodies; and it has issued a preliminary report dealing in the main with equipment, ventilation, and the working conditions of *x*-ray and radium departments. Apart altogether from direct protective measures, there can be no doubt but that *x*-ray work in many hospitals—and indeed in many private clinics—has been hitherto carried on in most unsuitable rooms: unsuitable as regards position, as for instance in ill-lighted basements, and also unsuitable as regards size, and with totally inefficient ventilation. Whatever may have been the dangers in the earlier days from these causes, they have been multiplied many times by the advent of modern powerful installations, Coolidge tubes, and hard radiations. Probably the value of daylight and sunshine plus good ventilation in *x*-ray departments has always been underestimated in the past, and much of the ill-health of *x*-ray workers can be put down to this cause. It is at the present time a paramount necessity that *x*-ray rooms should be large, that easy methods of darkening the rooms should be adopted so that no more time should be spent in artificial light than is absolutely necessary, and that large windows should let in plenty of daylight and fresh air. Further, in many large departments the dark room is altogether inadequate. The photographic assistant spends practically his or her whole time, day after day, in a small dark room with an atmosphere which becomes worse and worse as the day goes on. A dark room should be large, and as daylight is impossible, adequate ventilation becomes more than ever necessary. The hours of work should be restricted, and ample opportunities given to the staff for spending a considerable amount of time out of doors. Again, it is of practical importance in the arrangements for *x*-ray treatment that the patient only should be in the room whilst treatment is carried on with the modern highly penetrating rays, and the operator with all the control apparatus should be outside the *x*-ray-proof room: an adequate view of the inside is easily obtained through lead-glass windows. If these measures are adopted, then there is no necessity for the further protection of the operator carrying out the *x*-ray treatment. It is a great mistake to have, as is so often seen, these cubicles for patients too small: here again, adequate cubic space plus efficient means of changing the air are a vital necessity.

Recent research work, chiefly directed to the blood conditions of sisters, nurses, and the medical staffs of *x*-ray and radium departments, alluded to in last year's Medical Annual, has been carried on more systematically, and many papers are a warning to hospital authorities and to those engaged in this kind of work. Russ, Chambers, and Scott[7] have carried out researches on the effect of different doses of *x* rays upon the lymphocytes of the circulating blood of rats, and it is interesting to note that doses which produced definite blood changes in the animals were so small that photographic plates exposed to similar doses showed no visible photographic action. Mottram[8] records the results which have followed upon increased protection for radium workers. He describes the protective devices now being employed at the London Radium Institute, and the favourable results which have followed.

Experimental Work on Animals.—Lazarus-Barlow[9] describes some of the pathological effects of the exposure of animals to the gamma rays of 5 grm. of radium bromide. This paper deals *in extenso* with the blood changes and the effects on the muscular system, the heart, the liver, the kidneys, the gastro-intestinal tract, the generative system, etc., and contains a vast amount of detailed information.

A number of papers by Murphy[10] and others on the results of experiments on the fate of cancer grafts in mice, the association between lymphoid activity and resistance to cancer inoculation, and so on, when treated with varying doses of x rays, should be referred to by those interested in this subject. Bagg[11] has carried out a series of experiments to investigate the action of buried tubes of radium emanation upon normal and neoplastic tissues, and illustrates his paper with microphotographs. The results are fully discussed, and the author concludes that the experiments definitely indicate the therapeutic advantage of treating certain cancers by means of small unfiltered glass tubes, containing little radium emanation per tube, embedded 1 cm. distance apart. Levin's[12] paper on the rationale of radium therapy in cancer describes, amongst other things, experimental work on plants, and it is illustrated by beautiful microphotographs, etc. He also discusses the effects of radium on secondary deposits of malignant disease in bone, and this part is illustrated by radiographs taken before and after radium treatment. All these papers contain a vast amount of carefully recorded experimental work which it is only possible to indicate very briefly; the experiments and their results, however, must have a distinct bearing upon the technique of both radium and x-ray therapy, especially as regards malignant disease.

A paper by Webster[13] deals very largely with the literature of the action of x rays and radium on malignant cells, and admirably sums up the work and opinions of many authors. Two further papers of a more generalized character may be referred to. Knox[14] discusses the relative values of radium and x rays in a large number of common conditions: whilst Holland[15] reviews generally his personal experiences, extending over twenty-three years, of x-ray therapy. The latter paper should be of especial value to the general practitioner of medicine as summarizing the results which may be expected in all the more ordinary diseases in which x rays have been used, and is an indication as to the cases in which they should be used.

Pulmonary Tuberculosis.—Wilkinson,[16] reviewing the work done on the x-ray treatment of this disease, states that for eleven years he has been treating consumptives with x rays with good results. He describes his technique, in which he gives three exposures weekly, and considers that fibrosis and calcification are promoted, and that in cases at a standstill benefit soon follows. The cases progress toward complete arrest much more rapidly than they would without x-ray therapy. Guasett[17] also advocates the use of x rays in this condition in combination with ultra-violet rays. He controls x-ray therapy of the lungs by radiographs to show the site of the lesions.

Tuberculous Adenitis.—Reyn[18] is disappointed with the effects of x rays alone on tuberculous glands. He considers that x rays should be combined with the carbon arc lamp or quartz mercury lamp, except in those cases in which a single, freely movable gland can be excised. On the other hand, Ree[19] expatiates on the brilliant results he has obtained, and he has treated 470 cases. Improvement resulted in every instance, and a clinical cure in 85 per cent within a few months. If an abscess forms, he deprecates an incision and advises aspiration, x-ray treatment being continued. Tuberculous processes in the ribs, sternum, etc., are also favourably influenced by x rays. Tichy[20] investigated the after-results in 79 cases of tuberculous glands operated on, and found that 74 per cent had relapsed. On the other hand, only 11 per cent of those treated by x rays during the same period had relapses.

Ringworm.—Mazzoni and Palumbo[21] have treated 132 cases of ringworm with radium. The technique—a starch head cap to which radium applicators are attached—is described. Two sittings were given to each case, and the results were excellent. The advantages claimed over *x*-ray treatment are the uniform and constant action of radium, the certainty of the dosage, and the obvious ease of carrying out the treatment in children as compared with the difficulties of *x*-ray exposure.

Interstitial Keratitis.—Japiot and Bussy[22] have used *x* rays in this condition as an addition to the ordinary treatment, and claim marked improvement in results. It produces rapid relief of pain, photophobia, and blepharospasm, and considerably shortens the course of the disease. The technique, simple, is described: but in order to be successful the treatment must be employed before the deep lesions of the cornea have given rise to indelible scars. The younger the patient, and the greater the infiltration, the better the results. The greatest benefit is obtained in cases due to inherited syphilis.

Tonsils and Adenoids.—Sixty cases of hypertrophy have been treated with *x* rays by Witherbee[23] with favourable results. He prefers fractional to massive dosage, and details the technique he employs. He concludes that *x*-ray treatment is indicated in those cases of diseased tonsils associated with various conditions which contra-indicate operation or an anæsthetic. (*See also* TONSILS.)

Prostate.—In hypertrophy of this organ Stern[24] describes and illustrates the technique he adopts. He deprecates the more or less usual pessimism as regards *x*-ray treatment, and considers *x* rays of value, especially in early cases, when operation can be avoided altogether; whilst in advanced cases much benefit can be obtained. (*See also* PROSTATE.)

Laryngeal Papillomata.—Hickey[25] describes the radium treatment of intractable papillomata of the larynx. He narrates a case in which the lumen of the larynx was entirely occluded by papillomatous masses: operative treatment had been tried and had failed, and a tracheotomy tube had been worn for five years. After three applications of radium the papillomata had entirely disappeared, the vocal cords were visible, and the tracheotomy tube could be dispensed with for one half a day at a time.

Graves' Disease.—A comprehensive discussion[26] on this condition by physicians, surgeons, and radiologists will repay perusal in that it brings the knowledge of exophthalmic goitre up to date, and indicates very clearly the different points of view of various specialists. This discussion is of special value to radiologists and to general practitioners, and the satisfactory results of *x*-ray treatment is emphasized by Storey, Hernaman-Johnson, and others on the one hand, whilst on the other there is much criticism of *x*-ray results and after-effects by both physicians and surgeons.

Effects of X Rays on the Fœtus in Utero.—Aschenheim[27] describes the case of an imbecile boy, with sunken, nearly blind eyes, unusually small head, and occasional convulsions, which, he says, is the first authentic instance of *x*-ray injury of the fœtus. The otherwise healthy mother, then 37, was given deep *x*-ray treatment for myoma of the uterus, with four or five exposures. Conception must have occurred about a month before the treatment was begun.

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Dec., 199 ; [16]*Amer. Jour. Roentgenol.* 1921, 241 ; [17]*Jour. de Radiol.* Paris, 1920, July ; [18]*Hospitalstidende,* 1921, March, and *Brit. Med. Jour.* (Epitome), 1921, i, 87 ; [19]*Nederl. Tijds. v. Geneesk.* 1920, Nov., and *Jour. Amer. Med. Assoc.* 1921, Feb., 418 ; [20]*Centralbl. f. Chir.* 1921, April ; and *Brit. Med. Jour.* (Epitome), 1921, i, 19 ; [21]*Policlinico* (*Sez. Prat.*), 1921, April, and *Brit. Med. Jour.* (Epitome), 1921, ii, 1 ; [22]*Jour. de Radiol. et d'Electrol.* 1921, March, 106 ; [23]*Amer. Jour. Roentgenol.* 1921, 25 ; [24]*Ibid.* 292 ; [25]*Ibid,* 155 ; [26]*Proc. Roy. Soc. Med.* (*Clinical Sect.*), 1921, July, 1 ; [27]*Arch. f. Kinderh.* 1920, 68, and *Jour. Amer. Med. Assoc.* 1920, Nov., 1527.

RAT-BITE FEVER.

Sir Leonard Rogers, M.D., F.R.C.P., F.R.S.

F. W. Burton-Fanning[1] records five cases of rat-bite fever seen in Norfolk, all of which eventually recovered, although some ran a very prolonged course. The incubation period was from twelve to twenty-one days, but may extend to two months ; the fever shows periodic sharp rises of temperature with normal intervals of three or more days, with increase of local inflammation with each rise, together with pains in the limbs, sickness, diarrhœa and sore throat, and usually inflamed lymphatic glands and leucocytosis. **Salvarsan** and similar substances appear to have a specific curative effect.

Reference.—[1]*Brit. Med. Jour.* 1921, i, 886.

RECTUM, CANCER OF.

J. P. Lockhart-Mummery, F.R.C.S.

This subject has received considerable attention lately, and the surgical treatment of cancer was discussed at the meeting of the British Medical Association at Cambridge in 1920.

The most unsatisfactory feature with regard to this disease is that there is still failure to make an early diagnosis. It is difficult to know quite to what we are to ascribe this. Undoubtedly doctors are to some extent responsible, in that many of them do not appear to realize the early symptoms of the disease, and fail to make an examination when a case is first seen. While this is one of the causes, it is probably not the chief cause. Unfortunately cancer of the rectum produces such slight symptoms at first that the majority of patients fail to take any notice of it. It is quite a common thing for a patient not to consult a doctor at all until the symptoms have been going on for as long as six months. It cannot be too strongly insisted upon that loss of weight and pain are not early symptoms of carcinoma of the rectum : in nearly all cases the earliest symptom is slight diarrhœa. At St. Mark's Hospital in 1919 there were 47 new patients who attended the Hospital suffering from cancer of the rectum, and in no fewer than 42 of these—i.e., 89 per cent—the growth was fixed and inoperable when first seen. If any serious progress is to be made in the treatment of this disease, the first essential is that the public must be educated to consult their doctor earlier, and that the doctor must be educated to make a rectal examination in every case where there are symptoms which may possibly be due to this disease. That in the year 1920 we could still find over 50 per cent of cases of cancer of the rectum inoperable when first seen is a disgrace.

Cancer of the rectum is undoubtedly a curable disease, provided that the cases are detected early enough and that the rectum is entirely and adequately removed before the growth has extended beyond the rectal wall. At present only a very small proportion—something like 6 per cent of the cases subjected to operation—are what might be considered favourable from the point of view of complete removal of the growth. No other treatment but complete removal of the rectum offers any reasonable prospect of success, and it is now generally agreed among surgeons that a permanent colostomy and complete removal of the rectum in all cases is advisable.

With regard to the method of removal of the growth, there may be said to be two schools ; (1) Those who believe that the most extensive possible operation—namely, an abdominoperineal excision—should be performed in all cases; (2) Those who, like myself, believe that a properly planned perineal excision, with complete removal of all surrounding tissues and the pelvic gland area, is the best routine operation, and that an abdominoperineal excision should be reserved for growths of the rectosigmoidal junction, or for special cases.

The objection to the more extensive operation in all cases is that it has a very high mortality—over 30 per cent—and it is an operation that cannot be performed on a patient who is in any sense a bad risk; while the perineal excision can be performed, if proper care is taken, on almost any type of patient, and with success, and its mortality is under 8 per cent. So far as recurrence figures are available, they do not appear to show any very marked difference between the two operations, while undoubtedly the number of cases living 5 years after operation out of every 100 cases of cancer are much greater in the case of perineal excision than after abdominoperineal excision. Very considerable difference of opinion still exists, and many different types of operation are being performed. The best will, however, be that operation which saves the largest percentage of patients suffering from the disease, and it is just here that the most serious objection occurs to the more extensive operation, since it is only applicable to such a small percentage of the total cases.

Operability.—The question which is often difficult to decide is when a case is operable and when it is not. What used to be considered a hopelessly inoperable growth a few years ago would now be considered well within the limits of surgical interference. Some local fixation is no contra-indication, provided that the fixation is not to some organ that cannot be injured, such as the bladder or ureter. Involvement of the prostate is serious, but not necessarily fatal. Involvement of the vaginal wall, or even uterus, need not be a contra-indication to operation. As a rule, involvement of the bladder, ureter, or urethra may be considered as rendering the case hopeless. Extensive fixation generally contra-indicates operation, as the possibilities of completely eradicating the growth are very small.

Mere size of the growth is no contra-indication; nor is its position, though a growth low down in the rectum in a stout person, who is a bad operative risk, might be considered an operable growth, whereas the same growth situated at the upper end of the rectum in a similar type of patient would almost certainly be inoperable.

The general condition of the patient need not necessarily contra-indicate operation, provided that the growth is otherwise suitable for removal, and is not situated too high in the bowel. Thus, if a growth is one that can easily be removed by a perineal excision, the patient's general condition should not be allowed to stand in the way of removal, as by suitable regional or spinal anæsthesia, combined with gas and oxygen and twilight sleep, the risk can be reduced to a minimum, even when the patient is suffering from some other disease which increases the risk of operation.

One should never be in a hurry to declare that a growth is inoperable, as often after a preliminary colostomy and the use of antiseptics a surprising improvement in the growth occurs, and one which may have appeared to be inoperable comes well within the operable limit. The risk of operation in the case of a growth situated in the rectum itself should not be more than about 8 per cent at the outside, and in patients who are otherwise in good health it is very much less than this. Out of 24 cases operated upon in 1918 there were no deaths, although 3 of the patients were over seventy years of age and a good number over sixty years.

Contra-indications to Operation.—(1) Extreme age; (2) High blood-pressure with arteriosclerosis; (3) Kidney disease if at all advanced; (4) Extreme stoutness—this is probably the most serious of all.

Victor Pauchet[1] gives a long description of abdominoperineal excision. The method only differs in a few particulars from that generally performed by English surgeons.

Reference.—[1]*Presse méd.* 1920, Oct. 6.

RECTUM, PROLAPSE OF. *J. P. Lockhart-Mummery, F.R.C.S.*

J. P. Lockhart-Mummery[1] points out that in the treatment of prolapse in adults two conditions ought to be fulfilled. The prolapse has to be replaced and anchored in position, and the sphincter muscle has to be restored sufficiently to allow it to close the anus properly, otherwise the prolapse cannot be said to be cured. It is no good anchoring the bowel if a patulous anus is left, as the prolapse would almost certainly recur. In apparently slight, or recent, cases the sphincter muscle will generally recover without assistance after the prolapse has been restored. Where, however, much stretching of the sphincter has taken place, some form of plastic operation to restore the anus is necessary. The author describes his own operation for this condition as follows:—

"The rectum is thoroughly cleaned out with ether soap and lysol solution, and finally with 75 per cent spirit and picric acid, the skin of the perineum and buttock being similarly rendered aseptic: after the prolapse has been returned, a piece of gauze is placed in the rectum to prevent leakage during the operation. A transverse incision is next made about 2½ in. long midway between the tip of the coccyx and the posterior margin of the anus. This is deepened until the connective tissue between the rectum and the sacrum is opened. With blunt dissection or with gloved fingers this space is opened as high up as possible, and laterally until the rectum has been freed thoroughly at the back and sides. The whole of the space thus opened up is now lightly packed with sterilized vaseline gauze, 2 in. wide, and made with a sewn edge so that it will not fray and leave particles behind. A very considerable amount of gauze tape is used, but the object is to get this spread as flat as possible and not merely to fill the pelvis with it, and so block the rectum. As much as 40 yards of gauze has been employed in some cases. The end of the gauze is left protruding from the wound, and if (as is usually the case) more than one piece is used, all the ends are firmly tied together at the finish.

"*Treatment after Operation.*—The wound is dressed twice daily and fresh dressings applied, but the packing is not removed for a week. At the end of this time an anæsthetic is given, all the packing removed, and a fresh lot of gauze introduced; this, again, is left in for five days or a week, and then removed; this time no fresh gauze is introduced, a drainage tube being placed in the cavity left by its removal. The wound should not be allowed to heal under three weeks; in fact, the more slowly it heals the better the result. The bowels are kept confined until the seventh day after operation, when they are relieved by an enema before the removal of the packing; after this they are opened daily with an enema, a slipper bedpan being used. The patient is not allowed out of bed for six weeks, and not allowed to sit up for an action of the bowels for two months at least. It is most important, in view of the large area of cellular tissue opened up, that there should be no sepsis at the time of the operation, but sepsis later is almost certain to occur after the removal of the packing, and is of no consequence. The slower the wound heals and the more fibrous tissue involved, the better the result.

"Out of a total of 32 cases there have been only 5 failures, and two of these were permanently cured by repeating the operation."

Reference.—[1]*Lancet,* 1921, Feb. 5.

RELAPSING FEVER. *Sir Leonard Rogers, M.D., F.R.C.P., F.R.S.*

Etiology.—W. B. Leishman[1] records in his Horace Dobell lecture some new observations on the *Spirochæta duttoni* of African tick fever, and discusses the literature on the life-history of this group of organisms. In continuation of his well-known work on the granule phase of spirilla, he describes observations made with dark-ground illumination, and shows that when the infected ticks are kept at a temperature approximating that of the human body, the granule clumps which appear after the original spirochætes have disappeared increase in number and assume a circular or coccoid form, and subsequently there is a sudden appearance of small, thin, faintly-staining spirochætes in the tissues, quite unlike the original form, which never occurred at temperatures up to 24° C. With dark-ground illumination, these young spirochætes were seen emerging from granule clumps, the clumps also showing very active motility. After numerous references to the literature on the granule phase in other spirochætes, he refers to the recent work of Nicolle in Tunis and Sergent and Foley in Algiers on the *Sp. recurrentis* of the European type of relapsing fever, and points out that they found that in infected lice the original organisms disappear in a few days, but the greatest infectivity of the insects is during a stage when they could find no trace of the organisms in them, while later small spirochætes suddenly reappeared as in Leishman's ticks, so he suggests that granules may have been present in the infective stage during which no spirochætes could be detected. J. C. Kennedy[2] describes some bodies met with in the liver cells in a fatal case of Mesopotamian relapsing fever which he thinks may be a stage of the *Sp. recurrentis.*

Clinical Observations.—W. M. Post[3] met with several cases of relapsing fever in Persia complicated by a very troublesome form of caries of the costal cartilages requiring repeated operations, and he suffered from it himself. Cragg[4] discusses the seasonal incidence of relapsing fever in India, and points out that outbreaks in the United Provinces have occurred in the hot season, which is very unfavourable to lice. At Ahmednagar in the Bombay Presidency the repeated introduction of relapsing fever by recruits did not result in any serious spread in a large camp in the hot season, showing that some unfavourable factor was present which was probably the heat, as the disease occurs mostly in the winter in Europe. The louse would therefore appear to be a most unlikely carrier in Indian hot weather outbreaks of the disease, and he suggests a Pentamid bug, *Bragada picta*, as a possible agent. W. K. Calwell[5] describes relapsing fever in Palestine, where he studied 125 cases. The relapses averaged 4·5 against 1·35 in the North African form, and the time in hospital forty days, while the course differed from the Egyptian type of the previous year. The maximum incidence was in the colder months from December to April, and the disease ceased in the hot season, while the spirochætes were scanty in all stages of the disease; but leucocytosis with increase of the large mononuclears occurred, and monkeys were infected. **Kharsivan** in 0·6-grm. doses cured readily, but smaller doses were followed by some relapses; eusol intravenously failed. Ticks were suspected of carrying the disease. J. A. Sinton[6] describes relapsing fever as seen at Meshed in North-east Persia, including temperature charts which show the disease to have been typical relapsing fever, and not to resemble tick fever described by Harold and Wright in the same part of Persia. Leucocyte counts showed the polynuclears to be reduced to an average of 55 per cent, and the large mononuclears were increased during the pyrexial period. The louse appeared to be the carrier, and no ticks were found. In the absence of an appreciable amount of novarsenobillon, **Iron** and **Arsenic** gave good results, but tartar emetic had no effect in preventing relapses, and was depressant. H. D. Wright and C. H. H. Harold[7] describe an irregular type of relapsing fever in East Persia affecting 41 to 46 per cent of Indian troops sleeping in Persian houses, although the Persians were immune, and identified both *Ornithodorus* and *Argas persicus*, so considers the disease to have been tick fever.

REFERENCES.—[1]*Jour. R.A.M.C.* 1921, March, 161, and *Lancet*, 1920, ii, 1237 ; [2]*Jour. R.A.M.C.* 1920, Nov., 400, and *Trans. Roy. Soc. Trop. Med. and Hygiene*, 1921, 99 ; [3]*Surg. Gynecol. and Obst.* 1921, Feb., 169 ; [4]*Ind. Jour. Med. Research* (Sci. Congress No.), 1920. 22 ; [5]*Lancet*, 1920, ii, 785 ; [6]*Ind. Med. Gaz.* 1921, 241 ; [7]*Jour. R.A.M.C.* 1920, Sept. 203.

RENAL CALCULUS. (*See* KIDNEY, SURGERY OF.)

RENAL TUBERCULOSIS. (*See* KIDNEY, SURGERY OF.)

RESPIRATORY FUNCTION TESTS.

O. C. Gruner, M.D.

Pech[1] has devised an instrument for measuring the vital capacity. It consists of a mask such as is used for administering ether, with an outlet of a certain size. Immediately behind this there opens a tube communicating with a manometer, upon which one reads directly the number of litres taken in or given out, and, if desired, with a tambour for obtaining a graph. The lowest normal reading is 1½ litres. In tuberculosis it falls to ½ a litre per second, and in pneumonia to 200 c.c.

Desfosses[2] has used this manometric mask in the determination of the physique of school-children, and has studied the extent of nasal breathing among all classes. He has found it very slight in many cases supposed to be healthy.

Waller and Decker[3] have applied the method of measuring the CO_2 exhaled in order to determine the physiological cost of muscular work, especially among colliers. Hill and Campbell[4] believe that there is a fallacy here, as food increases the metabolism at once. Heald and Thomson[5] discuss the Flack respiratory tests of fitness for the air service.

REFERENCES.—[1]*Presse méd.* 1921, Feb. 2, 93 ; [2]*Ibid.* 94 ; [3]*Brit. Med. Jour.* 1920, i, 669 ; [4]*Ibid.* 733 ; [5]*Lancet*, 1920, ii, 736.

RETINA, DISEASES OF.

Lt.-Col. A. E. J. Lister, I.M.S.

Behr,[1] in a paper of great interest to physicians as well as ophthalmologists, gives some of the results of his studies of the alterations which occur in dark adaptation of the retina, in diseases of the optic nerve. The presence or absence of such changes is of value in the diagnosis of affections of the basal visual path, as well as in diseases of the choroid and retina. He comes to the important conclusion that in tabetic atrophy, isolated disturbance of dark adaptation may be the very earliest ocular sign, and occur when the ophthalmoscopic appearances and functions are otherwise normal. The patients, however, appear to be unaware of the loss of sight, and even state they see better in dim light. This is because the amounts of light dealt with by Piper's adaptometer, which Behr uses, are far below those which occur in ordinary experience.

Smith and Shastid[2] describe a case of *loss of retinal pigment due to scarlatina.* Ophthalmoscopic examination showed that the retinæ were abnormally transparent, due to an absence of the normal pigment. The authors attribute this to the toxæmia of scarlatina. They suggest the name 'aphytria retinæ' for the condition.

Jess[3] describes a case in which functional impairment of the whole retina was caused by observation of a solar eclipse in 1912. There was the usual macular lesion present, but investigation of the visual field with coloured objects showed that the function of the remainder of the retina was impaired. The dark adaptation was also affected.

Detachment of Retina.—Gonin[1] has written an interesting article on detachment of the retina. The cause is, he thinks, shrinkage of the vitreous, leading first to a detachment of the vitreous. The vitreous is attached at certain points to the retina, and, as it shrinks, these pull on the retina and give rise to detachment. He reviews the methods of treatment, and condemns a bandage which causes actual pressure on the globe. It is rarely tolerated, and may cause keratitis and painful iridocyclitis. It suffices, he says, to close the eyelids and thus restrict the movements of the eyeball. He advocates rest in bed, but says the position adopted should not always be the dorsal decubitus. In detachments situated above, the head should be elevated on pillows, and, if the patient is allowed up, he should rest in an arm-chair with the head thrown back. By a change to a sitting position after a time, the treatment is rendered more bearable and can be carried out for a longer time.

E. Thomson[5] says that 7 out of 75 cases of retinal detachment treated at Manhattan Hospital by **Trephining** were successful. Almost all cases improved temporarily, but detachment recurred if complete adhesion was not secured. A 2-mm. trephine is used. Patients should not be kept in bed too long. A week to ten days is probably sufficient.

A. E. Davis,[6] commenting on two cases in his practice of *recurrent retinal hæmorrhage* of adolescence, considers the origin still in doubt, but that the evidence points strongly to tuberculosis as the chief cause. No treatment beyond attention to the general health seems to be of any use.

Glioma.—Knapp[7] reports a case of glioma unsuccessfully treated by **Radium.** He emphasizes the need for a guarded prognosis, as cases relapse after considerable periods. Experience shows that the best results in cancer follow a large single dose, and Knapp suggests that his failure may have been due to the fact that a large enough single dose was not given at first. He calls attention to the varying degrees of malignancy of glioma and to the fact that very rarely spontaneous retrogression takes place. These points must be borne in mind in judging of the efficacy of radium treatment.

REFERENCES.—[1] *Klin. Monats. f. Augenheilk.* 1915, Oct., 193, Nov., 449 (abstr. *Brit. Jour. Ophthalmol.* 1920, 564); [2] *Amer. Jour. Ophthalmol.* 1920, Feb., 109; [3] *Klin. Monats. f. Augenheilk.* lxiv, 203; [4] *Ann. d'Oculist.* 1921, March, 175; [5] *Arch. of Ophthalmol.* 1921, 563; [6] *Amer. Jour. Ophthalmol.* 1920, Sept., 652; [7] *Arch. of Ophthalmol.* 1920, Nov.

RHEUMATISM. (*See also* GONORRHŒA; NON-SPECIFIC PROTEIN THERAPY.)

Herbert French, M.D., F.R.C.P.

Janowski[1] reports some rare localizations of rheumatism. The first case was that of a man with a temperature of 102·2° with suddenly developing pain in the right thorax. Auscultation then and twenty-four hours later was negative, but the condition became worse, and suggested a developing pneumonia. When, however, he was raised to permit auscultation, an extremely sensitive condition of the muscles of his right side was recognized. Treatment with salicylate cleared up the whole condition.

Some puzzling cases are also described in which rheumatism of the sacro-iliac synchondrosis and intervertebral articulations led to mistaken diagnosis of sciatica, osteomyelitis, and meningitis. They all recovered promptly with the administration of salicylates. When the rheumatism is limited to the dorsal region of the vertebral articulations, Pott's disease may be simulated, while pyelitis or gall-stones may be suggested by an affection of the junction of the ribs with the spine.

REFERENCE.—[1] *Paris méd.* 1920, Aug. 14.

RHEUMATISM AND GOUT.

In a recently published work[1] Percy Wilde regards rheumatism and gout, not as diseases, but as aberrations of normal physiological processes. He reminds us that the affected fibrous tissues, tendons, and ligaments reside in a lymph space immediately beneath the skin, and obtain their nourishment for the most part from the lymph instead of directly from the blood-vessels, as in other tissues. This lymph space also receives the products of muscular metabolism, such as lactic acid. The skin is the normal organ of excretion for these waste products, and its functional activity is increased by all causes, such as exercise, which increase the excretion of lactic acid into the lymph space. A check to the functions of the skin, such as is produced by a chill, and may be prolonged for an indefinite period, causes the retained lactic acid to enter into combination with the cell-wall of the tissues. The cell-wall he describes as really being the cement which binds the cells together, and consists largely of phosphate of lime.

Lactic acid has a great affinity for phosphate of lime, and not only combines with it chemically, but lime can take up a large quantity of 'additive' lactic acid. This additive lactic acid resists the action of alkaline fluids, but is liberated by heat. This he demonstrates by various experiments.

The author claims that rheumatic fever is the method by which nature liberates the lactic acid and causes its excretion by the skin, and that if fever is checked by antipyretics the retained lactic acid is likely to cause injury to the valves of the heart and there is prolonged convalescence and relapse. By raising the temperature of the body, even if it falls naturally, until the acid is removed, these results are avoided.

The treatment of chronic rheumatism is to simulate the process of the acute attack by daily raising the body temperature by various methods, which are described. Thirty years' experience of this method has convinced him that the majority of cases of chronic rheumatism, now often described as rheumatoid arthritis, are curable. True rheumatoid arthritis is largely due to absence of lime in the cell-wall in association with the rheumatic diathesis.

In respect to gout he denies that biurates are deposited in the tissues by the blood. He gives a number of microphotographs designed to show that the so-called urates are really crystals of lactophosphate of lime. He asserts that urate of soda does not exist in the body, and that the uric-acid theory is based on a series of chemical and histological blunders.

He states that the concretions found in the fibrous tissues, which he calls by the old name, 'lithates', are really dead cell-walls which have not undergone metabolism, and that the lactophosphate of lime has become insoluble by oxidation. It is a physiological law that the dead cell remains in cohesion with the living cell until it has undergone solution. This accounts for the remarkable adhesive power of the lithates which has never been explained. These lithates may remain in the tissues for months or years without producing symptoms.

He believes that the attack of acute gout is due to the 'additive' lactic acid in the cell-walls, in proximity to the lithate, being set free and causing its decomposition. Hence we may have acute gout in one joint and no symptoms in other joints which may contain lithates in large quantities.

He regards gout as being due to a functional inactivity of the skin which is usually accompanied by a subnormal temperature ; the consequent collection of 'additive' lactic acid in the cell-walls, absence of free lactic acid in the lymph space, and, generally, diminished fluidity, thus preventing the solution of lactophosphate of lime.

Sitting in a cold room until the body is chilled favours the deposit of lithates; active exercise, and all conditions which raise the body temperature and promote the action of the skin, favour their solution. But he points out that thermal methods which cause sweating but do not raise the body temperature fail to comply with the necessary conditions.

Reference.—[1] *Physiology of Gout, Rheumatism, and Arthritis.* Bristol: J. Wright & Sons, Ltd.

RHUS DERMATITIS.

E. Graham Little, M.D., F.R.C.P.

McNair[1] has determined the nature of the chief irritant in *Rhus diversiloba*, which he has named 'lobinol', and which he regards as an unsaturated compound of the aromatic series containing carbon, hydrogen, and oxygen. It is soluble in ether, chloroform, and several other media, none of which, however, can be used to remove the poison from the surface of the skin without some risk of harmful action on the skin. After much experimentation, he found that a solution of **Ferric Chloride,** 5 per cent in 50 per cent **Aqueous Glycerol,** applied locally, gave the most satisfactory results.

Alderson and Pruett[2] report encouraging results in treatment of cases of this dermatitis by the use of intramuscular injections of **Alcoholic Extract** made from **Poison Oak,** and they claim that almost always one such injection is followed by great relief of the local symptoms; swelling and itching begin to subside within twenty-four hours. They recommend the administration of no more than one injection, in doses of 1 c.c. of a solution prepared by a local pharmacist, and no specification of its strength is given.

References.—[1] *Arch. of Dermatol. and Syph.* 1921, June, 802; [2] *California State Jour. of Med.* 1921, May.

RINGWORM. (*See also* Radiotherapy.)

E. Graham Little, M.D., F.R.C.P.

Farley[1] has some interesting observations testing the durability of infectivity of several species of fungus. *Tinea corporis* seems to lose infectivity comparatively early, since no fungus kept in sterile black paper in a drawer grew in tests the smallest period of which was 211 days. On the other hand, fungus derived from the scalp and kept under similar conditions grew after 424 days' keeping, and epidermophyton of the groin after 433 days. There was no growth in a group of eight samples kept 500 days, so that there is probably a definite and not very advanced limit to survival of fungus under the conditions described.

Eczematoid Ringworm.—Wende and Collins[2] contribute an important paper founded on close study of 37 cases, in which special attention was paid to the study of the morphology of the parasite. These authors confirm the experience of White, who found the inguinal region less frequently affected than is common in Europe. They also confirm the common experience that the disease is more frequent in adult males, especially in those between twenty and forty years of age. Patches of scaliness, sharp in outline, with a history of initial vesication in parts, constituted the salient clinical symptoms. Itching and hyperidrosis, sometimes with a fœtid odour, are common.

In 26 of the 37 cases spores were found on microscopic examination, but only 13 of these were identified as epidermophyton. The authors used Sabouraud's media throughout, and mainly confirm his findings, but differ from him in the statement that two types of fungus may occur in the same lesion, and this happened in 4 of their cases.

Treatment.—Mazzoni and Palumbo[3] record the results of two years' experience of depilation in cases of ringworm by means of **Radium.** One cgrm. of radium bromide, enclosed in a hexagonal copper receptacle of 0·3 mm.

thickness of copper and 4 mm. of guttapercha, was found to radiate a distance of 6 cm. These hexagonal plates were attached to a closely-fitting cap of hygroscopic gauze, tied under the lower jaws, and extending 2 cm. beyond the hairy scalp. The plates are fixed by a bandage, and left in contact with the scalp for two periods of twenty-four hours. Depilation begins on the fifteenth day and is complete on the eighteenth day. The hair reappears in twenty to thirty days. No untoward results have been recorded. In one of the earlier cases radio-active material was discovered in the urine. It is claimed that the action of radium is more uniform than in the case of x rays. There were under treatment 132 cases, of which 90 cases were cured, 10 were not seen after depilation, and the remainder were under treatment.

REFERENCES.—[1]*Arch. of Dermatol. and Syph.* 1921, June, 759; [2]*Ibid.* Jan., 1; [3]*Policlinico,* 1921, April, 503.

ROSACEA.

E. Graham Little, M.D., F.R.C.P.

Unna[1] passes in review older conceptions of rosacea as a form of acne, and offers some useful differentiations between these affections. The identification of rosacea as a form of seborrhœa has transformed the whole subject, and especially brought about much more rational and successful methods of treatment. The following table summarizes the chief distinctions between acne and rosacea.

A.—General Characters.

ROSACEA PUSTULOSA	ACNE ROSACEA.
Slight affection of epidermis	Severe affection of epidermis
Superficial	Deep
Transient, variable	Persistent, not variable
Régime: mild measures	Régime: strong measures
B.—Association with Seborrhœic Eczema.	
Follows upon seborrhœic eczema of scalp	
Begins with patches of pityriasis alba	
Begins with red patches and lines	
Dilatation of capillaries and veins	
Yellowing of skin of mouth and nose	
Punctate dilatation of sebaceous follicles	
Concomitant alopecia seborrhœica and ciliary blepharitis	
C.—Association with Hyperkeratosis.	
	Stratum corneum thickened
	Begins immediately with comedones
D.—Nature of Pustules.	
Pustules superficial	Pustules deep
Site of election: middle of face	Site of election: sides of face
Back: free	Back: favourite position
Rapid variation in form and size	Form and size constant
Rapid and frequent change of position	Persistent in position
E.—Resultant Symptoms.	
	Deep-seated granuloma
	Purulent necrosis of skin and hair follicles
	Formation of double comedones
	Deep far-stretching scar formation
	Permanent deformity of skin of face

RUBBER TUBING, POISONOUS SUBSTANCES IN. (*See* Poisoning.)

SCABIES.

E. Graham Little, M.D., F.R.C.P.

Oppenheim,[1] who has had an extraordinary experience of the epidemicity of scabies in Vienna and has tried the system he recommends on 50,000 cases, considers that Hardy's 'French' cure, as he terms it, is far superior to the more commonly-used 'Wilkinson' cure, which is the favourite in Germany, and which he has had opportunities of comparing with his own modification of the 'French' formula, in which he substitutes **Precipitated Sulphur** for flowers of sulphur. The application is made in a very hot room, for two hours; the patient is covered with thick woollen garments and encouraged to sweat profusely; his clothes are disinfected at the same time, and he can return to his occupation immediately. The advantages claimed for this treatment are the avoidance of loss of work, many patients can be treated at the same time, no special building is necessary, and no linen is spoiled.

[The formula of 'Hardy's ointment', which is not specified otherwise by the author, is thus written by Darier (*Précis de Dermatologie*, 2nd ed., p. 833): **Flowers of Sulphur** 20 gr., **Carbonate of Potash** 10 gr., **Lard** 120 gr.—E. G. L.]

Lomholt[2] describes a method of treatment of scabies practised in Copenhagen, which it is claimed cures the patient in twenty-four hours, and is free from risk of excessive irritation. The patient receives an ordinary cleansing bath, wipes himself thoroughly, and then rubs the whole body, except the head, with the ointment to be described. After a quarter of an hour in the upright posture he goes to bed; and the next day, twenty-four hours later, receives a second cleansing bath, puts on fresh or disinfected clothing, and may be regarded as cured. It is particularly suitable for the ambulant patient.

The preparation of the ointment is a little complicated, demanding a certain amount of care and practice to obtain a perfect result. The detailed technique of the preparation (Marcussen) is here given:—

a. 1 kilo. of sublimated sulphur is dissolved at a gentle heat in 2 kilo. of a 50 per cent solution of potassium hydroxide. This makes a clear, yellow solution.

b. 225 grm. of vaseline and 225 grm. of water-free lanolin are carefully mixed, without heating.

c. To this mixture is added 375 grm. of the solution of sulphur in potash-lye mentioned above.

d. Fresh zinc hydroxide is prepared in mixing 28 grm. $ZnSO_4$ and 40 grm. 20 per cent sodium hydroxide, and this is afterwards added to the ointment.

e. Liquid paraffin is added to obtain a total weight of 1000 grm.

f. 5 grm. of benzaldehyde is added to check the somewhat disagreeable smell of sulphuretted hydrogen.

References.—[1] *Wien. klin. Woch.* 1921, March 3, 94; [2] *Lancet*, 1920, ii, 1251.

SCAPHOID, TARSAL, CONGENITALLY SEPARATE TUBEROSITY OF. (*See* Foot, Surgery of.)

SCARLET FEVER.

J. D. Rolleston, M.D.

Etiology.—Kobrak's[1] investigations in 87 cases of scarlet fever confirmed the importance of direct transmission of the disease from the sick to the healthy, and mainly by nasopharyngeal secretions, not by fomites. The disease was frequently brought into the family by some outsider, in whom the infection had not been detected. In 50 families, consisting of 227 members, the father, who kept away from the sick members, and the maid, who looked after the room but did not come in direct contact with the patient, never contracted the disease, a fact which testified against transmission by food, stools, urine, and healthy third persons. Contagion occurred more frequently in well-to-do families than in unhygienic surroundings, which seemed to confirm the view that overfed children, who as a rule are more inclined to throat affections, contracted scarlet fever more readily than the under-nourished. Kobrak points out that the comparative infrequency of contagion in the crowded houses of the poor is further evidence against desquamation being the chief vehicle of contagion.

A. Schlossmann[2] protests against the view that scarlet fever is of frequent occurrence in diphtheria patients, and states that from 1908 to 1910, out of 3723 patients admitted to the diphtheria block of the Dusseldorf Children's Clinic, only 32 cases, or 0·86 per cent, developed scarlet fever. Of these, 12 undoubtedly did not contract the disease in hospital, but had it on admission, and it was not certain whether all the rest had been infected in the hospital. Schlossmann is of opinion that the transmission of scarlet fever to diphtheria patients is mainly due to the fault of the doctors and nurses, who do not take sufficient care in washing their hands before passing from one disease to the other.

Symptoms.—In an article on *scarlet fever in the newborn*, G. Dorner[3] reports three cases to show that mothers suffering from scarlet fever may be allowed to suckle their infants, as during the first few months of life there is either entire immunity to scarlet fever, or if the infant contracts the disease the attack is so mild that it can only be detected on close examination.

H. A. Rosenbaum[4] states, that from 1913 to 1919, 1770 cases of scarlet fever were treated at the Durand Hospital, Chicago, and 106 developed *cardiac complications*; 94 of these occurred during the course of the disease, and 12 were instances of old heart mischief; 88 of the 106 patients, or 5 per cent of all the cases, had myocarditis, which in 53 was mild, in 31 moderately severe, and in 5 very severe. Though it may appear at any stage of the illness, it was commonest in the later part of the acute stage or in convalescence. Other complications seemed to increase the frequency of myocarditis. The complication was observed most frequently in the early years of life. Pericarditis was present in 3 cases, or 0·17 per cent, of which 2 were fatal. Endocarditis occurred in 4 cases, or 0·22 per cent. Functional murmurs of the apex were frequent, but were usually regarded as functional or relative. Rosenbaum suggests that the low percentage of endocarditis in his cases as compared with the incidence of the complication in several other series was due to the mild type of scarlet fever. Unless very severe, old heart disease does not necessarily indicate a grave prognosis in scarlet fever. (*See also* Medical Annual, 1921, p. 402.)

Broca[5] records a case of *spontaneous dislocation of the hip* in a girl, age 10, following subacute scarlatinal arthritis. The signs were those of an upward and backward dislocation. The diagnosis was confirmed by radioscopy, which also bore out the history in excluding congenital disease. Tuberculosis was not probable on account of the sudden onset. Moreover, the child had suffered from typical polyarticular scarlatinal rheumatism.

Diagnosis.—E. Wöhlisch and F. von Mikulicz-Radecki[6] discuss the value of *Döhle's inclusion bodies* (*see* Medical Annual, 1914, p. 500) and the *Schultz-Charlton sign* (*Ibid.*, 1921, p. 403) in the diagnosis of scarlet fever. Though it is incontestable that inclusion bodies are very constant in scarlet fever, typical inclusion bodies may occur in other diseases as well, especially typhus, in which they appear to be always present, and pneumonia, in which they occur in a third to a half of all the cases. They are not very uncommon in erysipelas, and may also be found in tuberculosis and in septic eruptions.

The latter is the only condition liable to be mistaken for scarlet fever. The writers emphasize the close parallelism between the number of typical inclusion bodies and the severity of the case. In 26 cases, 23 of which were examples of scarlet fever and 3 septic eruptions, the diagnosis was made correctly from a study of the inclusion bodies, with the exception of one very mild case of scarlet fever in which no inclusion bodies were present. In 21 cases in which the Schultz-Charlton or extinction sign was investigated, a well-developed scarlatinal eruption was in all but one instance caused to disappear by injection of normal or scarlet fever convalescent serum. The writers conclude that Döhle's inclusion bodies and the Schultz-Charlton extinction sign are a valuable addition to the differential diagnosis of scarlet fever, though failures may occur with both methods in cases of very mild scarlet fever or in cases with a slight eruption. On the other hand, G. Tron[7] found the Schultz-Charlton sign so inconstant as to be destitute of any diagnostic value.

Prophylactic Inoculation.—Takahashi[8] injected five of his own children, between 3 and 10 years old, with 0·0001 c.c. of blood of a scarlet-fever patient. Not only was there no general or local reaction, but a certain degree of active immunity was established, as was shown by the fact that hypodermic injection of 0·15 c.c. of blood from a scarlet-fever patient fifty days after inoculation, and smearing the throat of the children with the secretion of the throat and blood of the patient a hundred and fifteen days after inoculation, failed to reproduce the disease.

References.—[1]*Jour. Amer. Med. Assoc.* 1920, ii, 1461; [2]*Berl. klin. Woch.* 1920, 965; [3]*Deut. med. Woch.* 1920, 734; [4]*Arch. of Internal Med.* 1920, ii, 424; [5]*Jour. des Prat.* 1920, 641 (abstr. in *Med. Review*, 1921, 153); [6]*Med. Klinik.* 1921, 389; [7]*Riforma Med.* 1921, 55; [8]*Japan Med. World*, 1921, No. 2, 4.

SCHISTOSOMIASIS.

Sir Leonard Rogers, M.D., F.R.C.P., F.R.S.

Etiology.—N. Annandale and R. B. S. Sewell[1] have studied zoologically the Indian fresh-water molluscs to ascertain the presence of species which may carry the intermediate hosts of schistosome parasites, and describe the varieties met with, which are not very numerous, and are remarkably uniform over India. Several which harbour schistosomes of animals were found, together with two which may possibly harbour the asexual generation of hematodes affecting human health, namely, *Indoplanorbis exustus* and *Limnœa acuminata.* Annie Porter[2] in South Africa found *S. mansoni* in 4 out of 620 *Phyopsis africana* and in *Planorbis pfefferi*, and *Fasciola hepatica* in *Isodora tropica* and *Limnœa natalensis.* H. M. Perry[3] differs from Fairley in considering that the spines of schistosomes play an important part in enabling the ova to pass through animal tissues. F. Milton[1] discusses at length the problems of human schistosome disease which require further research, and thinks that the distribution of different species indicates that they may be inimical to each other in spite of the frequent concurrence in the same patient of *S. hæmatobium* and *S. mansoni.* He also discusses the production of immunity to the infection, and whether the schistosomes at present accepted as the same species in different parts of the world are really identical in the light of a close study of the extensive literature of the subject. F. G. Cawston[5] shows that, while wild birds eat many snails, they also convey young ones on their muddy feet to collections of water, and so may aid the spread of bilharzial disease.

Clinical Observations and Treatment.—F. G. Cawston[6] discusses the diagnosis of bilharzial disease, and has found Fairley's antigen test quite reliable, but the reaction may persist for several weeks after all the parasites have been destroyed. The same writer[7] also publishes a further general account of recent advances in the knowledge of this disease, which have already been recorded in this work. J. B. Christopherson[8] records evidence indicating that **Tartar Emetic** can permeate through the shells of bilharzial ova and directly poison the miracidia within them, and thinks the effectiveness of this drug in some parasitic diseases, and failure in others, depends on whether the organisms are permeable to the drug or not. H. B. Day[9] records an analysis of 1000 cases of bilharzial disease treated in Cairo, many as out-patients, and completely confirms Christopherson's earlier results and dosage. No less than 80 per cent of the agricultural population are infected, so that out-patient treatment is essential to success on any scale. Contra-indications are severe secondary septic infections, advanced cardial, renal, and arterial disease, except as in-patients, and pregnancy. Antimony continues to be excreted two or three weeks after the injections are over, and the short course of 8 to 9 gr. in four or five injections during the first ten days resulted in the ova being absent from the urine two weeks later ; but some relapsed, showing that the adult worms had not been killed, to effect which not less than 13 gr. are required, and a total of 24 gr. is advised, the urine being examined for living ova at the end of the course and after three months to be certain that a cure has been effected. Mild septic infections also improve. **Colloidal Antimony** in 5- to 10-c.c. doses intramuscularly is also effective, while **Emetine** intravenously or intramuscularly in $\frac{1}{2}$- to 3-gr. doses, about seven doses being given, is also curative, but expensive, although of great value in children with small veins in whom tartar emetic cannot be given. F. O. Lasbrey and R. B. Coleman[10] also report on 1000 cases treated at the C.M.S. hospital, Old Cairo, with similar success, and advocate a total of 20 to 25 gr., being equally effective whether given rapidly or spread over a considerably longer period ; after the confidence of the people had been gained 70 per cent of cures were obtained, with a mortality of only 1 per cent due to advanced cases being included ; the surgical treatment of complications was much aided by the injections. Sixty patients could be injected in one hour. W. Simmons and H. Irving[11] record success in the treatment of bilharzial disease in soldiers returned to Australia, thus greatly lessening the danger of the infection becoming indigenous in that continent.

F. G. Cawston[12] records the cure of a patient harbouring *S. japonicum* by **Tartar Emetic** in doses of from $\frac{1}{2}$ to $1\frac{5}{8}$ gr. and a total of $20\frac{1}{2}$ gr., the symptoms disappearing and his serum giving a negative reaction.

REFERENCES.—[1]*Ind. Jour. Med. Research*, 1920, July, 93 ; [2]*S. African Med. Jour.* 1920, Nov., 75 ; [3]*Jour. R.A.M.C.* 1920, Dec., 487 ; [4]*Jour. Trop. Med. and Hygiene*, 1921, 13, 27 ; [5]*Ibid.* 109 ; [6]*Lancet*, 1920, ii, 1045 ; [7]*S. African Med. Jour.* 1921, 113 ; [8]*Brit. Med. Jour.* 1920, ii, 854, and *Lancet*, 1921, i, 522 ; [9]*Lancet*, 1921, i, 525 ; [10]*Brit. Med. Jour.* 1921, i, 299 ; [11]*Med. Jour. of Australia.* 1921, Jan. 29, 83 ; [12]*Jour. Trop. Med. and Hygiene*, 1921, 13.

SCHOOL MEDICAL SERVICE.

Joseph Priestley, B.A., M.D., D.P.H.

Poisonous Berries in a Public Park.—An important decision has been given, on appeal before the House of Lords, upholding a judgement of the Second Division of the Court of Session in Scotland, whereby damages were awarded to a father for the death of his son, following on the eating of berries from a belladonna shrub growing in the Botanical Gardens, Glasgow. The portion of the Gardens where the shrub grew was open to the public, and adjoined a children's playground. The alluring look of belladonna berries is well known to all botanists, making the shrub (when the fruit was ripe) a veritable trap for children, especially when town bred. The berries could easily be mistaken for grapes or cherries, and there was nothing at all to show, or even to suggest, that they were poisonous and must not be eaten. That the authorities of a botanical garden (apart from the additional fact that such authorities were also the health authorities of the district) should have acted in the way that they did, seems incredible. The judgement of the Appeal Court will certainly be unanimously approved by all common-sense persons, and will rank as an important judgement.

Elementary v. Secondary Schools Medical Inspection.—Secondary schools now come in for compulsory medical inspection of the scholars in the same way as the elementary, and the last Report of the Board of Education compares the results of such medical inspections in the two sets of schools. The secondary schools number 1383, with (approximately) 378,000 pupils. The Board has decided that medical inspection of the pupils shall take place at their entries, and yearly afterwards, except in case of pupils below the age of twelve years.

Speaking generally, the secondary schools show results of a higher standard in general health, less malnutrition, fewer unclean heads and bodies, and a lower percentage of scabies. On the contrary, the secondary schools show higher percentages in defective vision, defective hearing, headache and nerve strain, and bodily deformity (spinal lateral curvature and flat-foot). One fact is proved : that medical inspection of pupils of secondary schools was needed, though an opposite opinion has often been expressed, it being stated that, as the pupils of secondary schools are drawn for the most part from better-class homes, medical inspection was not necessary.

SCIATICA.

J. Ramsay Hunt, M.D.

Surgical Treatment of Chronic Sciatica.—Mill Renton[1] discusses this subject, and states that while the majority of cases of sciatica can be cured by medical means, there are still a certain number in which medical treatment fails. In a considerable proportion of these cases, a rapid and complete recovery can be obtained by operation. The benefits of surgical treatment have not been as widely recognized as they might, on account of a lack of appreciation of the type of case suitable for operation, and the performance of an unsatisfactory operation—namely, nerve-stretching. If the correct type of case is selected and the operation of nerve-freeing is performed, a cure can be obtained in practically every instance.

Cases may be roughly classified into three types : (1) Those in which the patient is quite free from pain while at rest, but begins to have pain on exercise or on assuming some special position ; (2) Those in which there is a certain amount of pain while at rest, but this becomes really intense on exercise or on the assumption of a particular position ; (3) Those in which the pain is of an indefinite character, present at rest off and on, and sometimes improving to a certain extent on exercise.

In *Type* 1 the pathology of the condition seems quite clear. The inflammation of the nerve has subsided, but adhesions have been left around the nerve as a result of the inflammation. These vary from fine adhesions to definite bands of fibrous tissue. Their mode of action seems clear, as it is only on movement that they drag on the nerve and set up pain. This type is pre-eminently the one suited for surgical treatment and in which recovery by operation is certain.

In *Type* 2 one has the same condition of adhesions round the nerve, but, in addition, one presumes there is a varying amount of inflammation of the nerve itself still present. In some instances it is possible this may be kept up by the pull of the adhesions, especially where the patient has been making great efforts to go about. The majority of cases of this nature can also be cured by operation ; but the pain sometimes takes longer to disappear.

In *Type* 3 the pathology is not so clear, but it would seem likely that here one has a neuritis without the presence of adhesions round the nerve. In the only case of this kind where I have operated no adhesions were found. This type appears to be unsuitable for surgical treatment.

Operation.—The surgical treatment is extremely simple, and consists essentially in freeing the sciatic nerve from adhesions. This is done by exposing the nerve below the gluteus maximus by a four- to five-inch longitudinal incision, hooking it up, and then carefully removing all adhesions from the sacrosciatic notch to about the middle of the thigh. The adhesions may be fine and readily separated by the finger, or they may consist of strong bands that have to be divided. All tags and loose ends of adhesions should be dissected away. The branches to the hamstrings which come off just below the lower border of the gluteus should be preserved. The nerve is then dropped back into the wound and the skin sutured. No splint is applied, but the patient is kept in bed for ten days and then allowed up.

It is not possible to give records of a very large series of cases, as the operation is only indicated in a limited number of patients. Crawford Renton has recorded 32 cases of operation extending over a period of thirteen years, and all of these were cured or rendered well enough to return to active life. The author personally has operated on 10 cases; 6 of these were of *Type* 1, and all of them recovered completely; 3 were of *Type* 2, and of these 2 made a complete recovery, but the third, although greatly improved and able to return to active work, still complained of some pain and numbness of his foot a year later; 1 was of *Type* 3; no adhesions were found, and no benefit followed the operation.

REFERENCE.—[1]*Brit. Med. Jour.* 1921, i, 557.

SCLERODERMIA.

E. Graham Little, M.D., F.R.C.P.

Ayres[1] reports 3 consecutive cases of diffuse scleroderma, all of which showed arsenic in the urine. He comments on the symptoms common to the disease and to arsenical poisoning, which are tabulated below. In view of the many articles of domestic use which may be tainted with arsenic, accidental absorption of the drug must be common, and it is somewhat remarkable that 21 out of 48 cases of patients selected at random by Putnam in the Massachusetts General Hospital showed traces of arsenic in the urine.

COMPARATIVE SYMPTOMATOLOGY OF DIFFUSE SCLERODERMIA AND CHRONIC ARSENIC POISONING.

Symptoms	Diffuse Sclerodermia	Chronic Arsenic Poisoning
Neuritic symptoms	Numbness, tingling, aching, sometimes soreness and severe neuritic pains in involved areas, frequent multiple joint stiffness	Similar symptoms; marked cutaneous hyperæsthesia
Pigmentation	Invariable, sooner or later; most marked on sclerodermatous areas; may be diffuse; may be mottled	Common; diffuse or localized, especially on exposed parts or in folds of joints; frequently mottled
Cutaneous changes	Sometimes erythema and œdema early; later, skin becomes hard, bound down, glossy; sometimes ulceration; roughness of nails, loss of hair, hyperidrosis of palms and soles; keratosis	Sometimes erythema, frequently keratosis, diffuse or localized to palms and soles, sometimes with desquamation; sometimes papules, pustules, vesicles, or bullæ; frequently œdema of eyelids, roughness of nails, loss of hair, hyperidrosis of palms and soles
Loss of weight	Usually marked	Present

Continued on next page

DIFFUSE SCLERODERMIA AND CHRONIC ARSENIC POISONING—*continued.*

Symptoms	Diffuse Sclerodermia	Chronic Arsenic Poisoning
Areas of involvement	Frequently extremities and face	Motor and sensory symptoms alike affect principally the distal portions of extremities, rarely extending above elbows and knees ; face frequently involved
Gastro—intestinal	Sometimes pyrosis, constipation, diarrhœa, vomiting, abdominal cramps ; may be no symptoms	Same symptoms are common
Fever	Not constant ; there may be several degrees during active progression of disease, or at death	At times slight irregular fever
Onset	Frequently with numbness and tingling of hands and feet ; sometimes with stiffness of jonits ; occasionally with symptoms of Raynaud's disease	Frequently with gastralgia or with numbness or tingling of hands and feet
Vasomotor disturbances	Usually present, especially in fingers	Common
Heart	Occasionally irregular or rapid	Occasionally irregular
Eyes	Not usually affected	Frequent conjunctivitis
Muscular weakness	Frequently present	Usually present
Headache	Not usually complained of	Common
Mouth and throat	Disease sometimes begins with an attack of sore throat ; occasionally hoarseness is present	Frequent sore tongue and mouth occasional hoarseness and bronchitis, coryza, cough
Salivation	Not recorded	Frequent ; marked thirst
Anæmia	Occasional	Occasional
Menstruation	Occasionally irregular	Occasionally irregular
Paralysis	Not recorded ; disability from fixation	Occasional
Sudden death	Occasional	Not recorded

REFERENCE.—[1]*Arch. of Dermatol. and Syph.* 1920, Dec., 747.

SCOLIOSIS. (*See* ORTHOPÆDIC SURGERY.)

SEBORRHŒA. (*See also* ROSACEA.) *E. Graham Little, M.D., F.R.C.P.*

Sabouraud[1] insists very rightly on the restriction of this term to conditions of the skin associated with sebaceous flux, best noted on the central part of the face, the nose ; but the fatty hypersecretion is also the capital symptom on the scalp, and may in this region be demonstrated by application of 'silk-paper', which becomes grease-stained. There is usually loss of hair when this symptom is established. With a lens one can determine gaping pilosebaceous orifices on the scalp, denuded of hair, and filled with fatty plugs. These two symptoms, loss of hair and fatty hypersecretion, are the characteristic marks of seborrhœa. They may or may not be associated with desquamation of the scalp in fine scales ; but it is important to realize that desquamation is not in itself a cardinal symptom of seborrhœa, although often regarded as such. Against seborrhœa and all its many derivatives, Sabouraud contends that there is no medication comparable with **Sulphur,** and he further recommends it as the best application for any disorder of the pilosebaceous follicle, in which he includes acne, sycosis, suppurating folliculitis, boils, and Brocq's pseudopelade. The form of sulphur employed seems indifferent. and it may be used in ointment or lotion or powder, of which he gives the following examples :—

As an ointment :—

℞ White vaseline	30 grm.	Precipitated sulphur (washed)	3 grm.
Perfume to taste.			

As a lotion :—

℞ Precipitated sulphur (washed)	10 grm.	Neutral glycerin	10 grm.
Perfumed alcohol	30 grm.	Distilled water	ad 120 c.c.

As a powder, a form which he recommends strongly :—

℞ Precipitated sulphur (washed)		Oxide of zinc powder	10 grm.
Talc powder	āā 16 grm.		

All these methods are valuable, but in rebellious cases Sabouraud recommends above all other methods the application of **Carbon Disulphide,** which dissolves fat like ether, carries a large content of sulphur, and penetrates deeply into the skin. He would reserve the method, which is excessively disagreeable in application, and owing to the inflammability of the product not free from risk, for the worst cases which have resisted other means. The following is the method of application, either in the open air (best) or in a room free from any naked flame, even that of an open fire : a piece of cotton-wool is soaked in the mixture, a convenient formula for which is **Carbon Disulphide** 300 c.c., **Sulphur** 6 grm., and rough friction is made all over the scalp with this for 20 to 30 seconds, during which the patient holds his breath so as not to inhale the fumes, and he should throw the used cotton-wool out of window or into the w.c. The scalp is to be treated in the same way as the face or other parts, and the application may be made daily. The immediate sensation of intense burning produced by contact with the drug passes off rapidly, as also does the very disagreeable smell, so the whole treatment and its inconveniences do not last more than a minute.

Sabouraud thus details the treatment to be given to a young man threatened with premature loss of hair (the type of case in which its value is pre-eminent) : (1) Rapid friction every night with a wad of wool soaked in the disulphide lotion prescribed, rubbed in for thirty seconds, the patient holding his breath and shutting his eyes ; (2) Wash the head every morning with soap and hot water ; (3) Dry the scalp and rub in a tonic lotion with a hard brush wet with the same, e.g., quinine, pilocarpine, etc. The treatment is less practicable with women, as the long hair makes the application difficult, and one cannot recommend slow application in partings of the hair, for fear of intoxication with the fumes. Finally, the author gives the warning that many patients are not to be trusted with the application, and in some cases there is a definite susceptibility to sulphur dermatitis which prevents its employment.

REFERENCE.—[1]*Presse méd.* 1921, May 14, 381.

SEMINAL VESICULITIS.

Sir John Thomson Walker, F.R.C.S.

Cunningham[1] discusses the local and general manifestations of seminal vesiculitis and the treatment. Locally there is persistent and remittent urethral discharge which cannot be cured by ordinary methods. Belfield injected antiseptic solutions into the vas deferens and they entered the seminal vesicles. This procedure has not proved a success, because it is seldom that a single injection produces a cure, and repeated injections are not always possible because of the difficulty in keeping the vas open, and further, the solution does not enter all the infected areas. In such cases nothing short of **Surgical Drainage** or **Extirpation** of the seminal vesicles will result in a cure. The author has done this operation on 40 patients. As a result of the operation the patients are free from any urethral discharge before the operation wound is healed. Fuller first pointed out that certain cases of arthritis were cured by drainage of the seminal vesicles, and the procedure here does not differ from that used for local manifestations, except for the use of gonococcal vaccines and certain orthopædic methods. The patients are not impotent after the operation, but they are sterile. It is doubtful, however, if many of them were not sterile as a result of the inflammatory condition before the operation.

Lespinasse[2] describes a number of methods for making injections through the vas deferens in the treatment of seminal vesiculitis. In one the vas is exposed and wrapped in a Thiersch graft so that it projects from the scrotum. A second method consists of the intradermal transplantation of the vas. The most simple procedure is a 'percutaneous puncture' of the vas. To insert a needle into the vas without making an incision through the skin, the vas is held in a small fold of skin by clamps. The author found that 10 per cent **Collargol** was the least irritating antiseptic. A 1 per cent solution of **Sodium Bicarbonate** was safe, but a 5 per cent solution is destructive of epithelium. **Bactericidal Serum** is absolutely specific.

Paul[3] describes a special needle for injecting the vas deferens. About three-quarters of an inch from the point, which is square and with smooth edges, there is a shoulder to prevent the regurgitation of fluid.

In an exhaustive account of seminal vesiculitis, Zigler[4] describes non-bacterial vesiculitis due to excesses, and bacterial vesiculitis most frequently due to the gonococcus. Other organisms present are staphylococci, colon bacilli, and tubercle bacilli. In acute seminal vesiculitis occurring in the course of acute urethritis, the symptoms are high temperature, and pain and tenderness over the bladder. In the rectum one or both vesicles is found distended, bulging, and very tender. In some cases they become soft and go on to abscess formation. There is frequent micturition, and also difficulty, and some pain, and a feeling as of a mass, in the rectum ; finally there is retention of urine. Difficulty in defæcation is occasionally present. In some cases the abscess bursts into the rectum, and may leave behind a sinus ; in other cases it may gradually resolve by emptying its contents into the urethra through the ejaculatory ducts, leaving behind a large infiltrated sclerotic seminal vesiculitis with involvement of the post-prostatic rectovesical space. In chronic seminal vesiculitis the patient suffers from general weakness and neurasthenia, which may go on to melancholia of the sensitive type. Locally there is pain in any part of the genito-urinary tract, which may be localized or shifting. There is constant sexual irritation, urethral discharge, and in other cases spermatorrhœa and impotence. The urinary symptoms are frequency, urgency, pain at the end of micturition, and even attacks of retention. Treatment is general and local. The general treatment is directed towards soothing the mental condition and treating anæmia and arranging the diet. Local treatment in acute cases consists in **Hot Rectal Irrigation** and **Saline Cathartics**; in chronic catarrhal vesiculitis gentle **Massage** of the vesicles, and in the chronic sclerotic type more vigorous massage. The massage requires skill and is done once a week. The duration in a catarrhal case is about two to three months; in a sclerotic case six months to a year.

In rheumatic arthritis Sanders[5] insists that the seminal vesicles should be considered as a possible focus. Ordinary cases of seminal vesiculitis are cured by massage of the vesicles, but in chronic sclerotic cases the ducts are blocked and massage may cause epididymitis. Belfield found blocking of the ducts in 1 per cent of cases. The author employed vas punctures and injections of 20 per cent solution of **Argyrol** intead of collargol as used by Belfield. He found a decided improvement in the arthritic condition.

Cumming and Glenn[6] treated 55 cases of chronic seminal vesiculitis by Belfield's method, filling the diseased vesicles through vas punctures with a 5 or 10 per cent **Collargol** solution. The end-results were as follows: 40 patients were returned to duty within three weeks apparently permanently cured; the remaining 15 patients, who required treatment of prostate and urethra also, were cured within six weeks, with one or two exceptions. The series included 4 cases of gonorrhœal arthritis.

REFERENCES.—[1]*Boston Med. and Surg. Jour.* 1921, Feb. 24, 189; [2]*Surg. Gynecol. and Obst.* 1920, Dec., 485; [3]*Jour. Amer. Med. Assoc.* 1920, Sept., 877; [4]*N. Y. Med. Jour.* 1921, May 4, 666; [5]*Ibid.* 687; [6]*Jour. Amer. Med. Assoc.* 1921, March 12, 757.

SENECIO POISONING. (*See* POISONING.)

SENSORY DISTURBANCES OF CORTICAL ORIGIN. *J. Ramsay Hunt, M.D.*

Sensory disturbances after injuries of the cerebral cortex are described by Head and Riddoch.[1] With focal lesions in the post-central region of the cortex, after a sufficient length of time has elapsed for the lesion to become stationary, the disturbance of sensibility in the opposite hand is sometimes found to be confined to one or two fingers. The patient is usually fully aware that something is wrong with his fingers, especially when those on the radial side of his hand are affected. For example, on being questioned he may say that his little and ring fingers are normal, but that something is wrong with his index and middle fingers. They feel different; he can use them, but they are clumsy. On examination, he responds correctly to tactile, thermal, and painful stimuli, but the intensity of the stimulus required to evoke a response from the affected parts may be increased. Thus, he may be unable to recognize that he is being touched with a wisp of cotton-wool, but when it is moved over the surface of the skin, and especially if hairs are displaced, he responds at once. Again, the sensation evoked by a pin-prick may not seem so 'sharp' or so 'clear' as over normal parts, and at the same time the discomfort it produces may be increased.

Thus, although the crude recognition of touch, pain, heat, and cold is never abolished as a result of a cortical lesion, yet sensibility is modified. To evoke a sensation a stronger stimulus has often to be applied to the affected than to the normal fingers. Further, the patient is frequently unable to appreciate differences in the intensity of stimuli of the same sensory quality—as, for example, between water at 26° and 40° C.

Hypotonia and inco-ordination are associated with loss of postural recognition, so that the fingers can be hyperextended more than the corresponding digits of the other hand, and their movements are clumsy. The power of appreciating differences in weight, and of recognizing the shape and relative size of common objects, may be gravely disturbed. When the patient is tested for the appreciation of relative size and form, the loss of sensation is not infrequently so gross that he is quite unable to recognize the nature of common objects.

Thus the sensory activity of the cortex is not concerned with the crude recognition of touch, pain, heat, and cold, but it is necessary for the recognition of the intensity of stimuli, of special relations, and the appreciation of similarity and difference in external objects. Each of these functions may be disturbed independently of the others as the result of lesions of the cortex, and in the hand the sensory loss may be limited to one or more fingers.

REFERENCE.—[1]*Brit. Med. Jour.* 1920, ii, 182.

SHOULDER, RECURRENT DISLOCATION OF. (*See* ORTHOPÆDIC SURGERY.)

SINISTRALITY IN RELATIONSHIP TO HIGH BLOOD-PRESSURE AND DEFECTS OF SPEECH.

Herbert French, M.D., F.R.C.P.

Some very interesting researches upon quite a side-track of medicine have been carried out by Quinan[1] in regard to sinistrality, and some curious associations with left-handedness were discovered, amongst which the greater tendency of left-handed people to have high arterial tension was pronounced. In Quinan's opinion all the evidence goes to show that left-handedness is hereditary, and that it indicates a defective organization of the central nervous system; and he goes further, and deduces that as raised blood-pressure was commoner in left- than in right-handed people, it is very likely that an hereditary predisposition is a definite factor in the etiology of high blood-pressure, and that high arterial tension is suggestive of constitutional inferiority.

Stammering is another defect of the nervous system which tends to be associated with sinistrality to the extent of something between three and seven times greater proportional frequency than it is with right-handedness.

A mean value of 154·5 mm. Hg was obtained for the blood-pressure in Quinan's dextral group of 600 men of ages between 44 and 89; whereas in the crossed sinistrals in the same group of men, the mean value of the blood-pressure was 182 mm. Hg—an interesting observation.

Quinan's paper also gives some statistics upon the incidence of left-handed people in the community, and he quotes from Biblical authority the fact that the tribe of Benjamin, which numbered about 25,000 men, contained 700 left-handed soldiers who were specially skilful with the sling, so that at that remote age there were about 3 per cent sinistrals amongst the male population. Under modern conditions about 4 per cent of normal people are left-handed.

Modern statistics are probably more trustworthy. Scharfer,[2] Ballard,[3] and Smith[3] found respectively 4·06, 4, and 4·5 per cent of left-handedness from surveys of a combined total of 32,318 school children. Stier[4] noted 5·1 per cent as the proportion among 5000 army recruits. Both Ireland[5] and Smith[3] reported 11 per cent of left-handedness from their investigations of imbecile and feeble-minded children. Smith[3] states that the proportion among 500 delinquents was 6 and 11 per cent, respectively, for boys and girls, whereas the proportion among 500 deaf was 4·5 per cent.

REFERENCES.—[1]*Arch. of Internal Med.* 1921, Feb., 255; [2]*Berl. klin. Woch.* 1911, i, 295; [3]*Jour. of Exper. Pedagogy,* 1911, i, 298; [4]*Deut. med. Woch.* 1909, xxxv, 1587; [5]*Brain,* 1880, iii, 207.

SKIN, CANCER OF. (*See also* EPITHELIOMA.)

E. Graham Little, M.D., F.R.C.P.

Treatment by X Rays.—Thedering,[1] while asserting in the forefront of his paper that surgery is always the best method of treating cancer, gives directions for those cases which for some reason do not admit of operative measures, and urges that the affected glands should be treated first, and with special attention. He follows the routine practice of raying the periphery of a growth before attacking the growth itself. When cancer of the breast has been operated on, and recurrence has taken place in the site of operation, the ribs and breast-bone should be deeply rayed. The object of treatment is to treat the site of disease as strongly as one can in one sitting,. The single dose to be given is thus a large one, from 8–12 H. units. Only hard rays, filtered through 3 to 4 mm. aluminium, are to be used.

Reference.—[1]*Münch. med. Woch.* 1920, Sept. 24, 1119.

SKIN DISEASES, GENERAL THERAPEUTICS.

E. Graham Little, M.D., F.R.C.P.

Pautrier[1] gives the following formula for **Sulphur Intramuscular Injections,** which he recommends in *psoriasis, acne,* and *alopecia*: octahedral sulphur 8 gr.; cholesterinated oil 80 gr; eucalyptol 20 gr. The oil in this combination is either the fat of the kidney of the horse or, more conveniently, cod-liver oil; the cholesterin is added to facilitate the absorption of sulphur; the quantity added is not specified, 1 to 2 c.c. The dose is repeated twice a week, into the buttock. In psoriasis Pautrier uses it in combination wlth local application of **Chrysarobin,** and prescribes the following formula for an ointment stick: acid. chrysophan. 5 gr; oxycade (oil of cade, rectified and distilled) 30 gr; cholesterinated wax 65 gr. In alopecia the combination was especially successful, which the author explains by the statement that many cases of alopecia suffer from a sulphur demineralization. In acne the remedy was much less active, but seemed to have a certain degree of usefulness.

Pyogenic Infections.—Bockenheimer[2] sprays boils and carbuncles with **Ethyl Chloride,** mixed in the nozzle with air, which increases the refrigerating effect. He claims that incipient infections are aborted, and cure is accelerated, without conspicuous scarring.

Pranter[3] recommends a new preparation of silver, Merck's '**Choleval**', in several conditions. A 0·5 to 1 per cent watery solution, used as a compress, soaked in bandages which are applied to the leg in a prone position, is especially useful in *ulcerations of the leg.* Under this treatment ulcers are said to clear up and granulate in a few days. Later a 5 per cent choleval zinc paste, or Merck's 3 per cent choleval bolus, may be used. Solutions as strong as 10 per cent may be tolerated, and are indicated in very septic ulcers. Choleval is useful in *bed-sores* and in *burns* of the third degree. Wet *eczemas* are well treated with compresses of 0·5 to 1 per cent, and later with choleval zinc paste of the same strength. Impetiginous eczema is also improved with the same applications, and here in the later stages 3 per cent choleval bolus is especially valuable. *Intertrigos* dusted with powders of 1 to 3 per cent choleval usually do well. Fissured eczemas of the hands, feet, and breasts may be dusted with a 1 to 5 per cent choleval talc powder. Eczema of the genitals and anus is best treated with 1 to 5 per cent choleval zinc paste. Mycotic eczema of the fingers and toes does especially well with 1 to 5 per cent ointments, and later dusting with choleval talc powder.

Cehasol.—This is a preparation like ichthyol, produced by fractional distillation of fossil fish. It is very soothing to inflamed skins, and is well tolerated. Cehasol, 10 to 20 per cent, added to vaseline or ung. diachylon, is especially recommended by Planner[1] in wet *eczemas.* Added in the same strength to Lassar's paste, it is also useful in the same conditions. It may be mixed with water or with glycerin; it is an excellent disinfectant of the skin, and can be recommended in pyogenic affections generally, and in erysipelas, in acne rosacea, and in chilblains.

References.—[1]*Presse méd.* 1921, May 21, 401; [2]*Jour. Amer. Med. Assoc.* 1921, Feb. 12, 487; [3]*Wien. klin. Woch.* 1920, Sept. 25, 851; [4]*Wien. klin. Woch.* 1921, Feb. 3, 47.

SKIN DISEASES, PROTEIN SENSITIZATION IN.

E. Graham Little, M.D., F.R.C.P.

Towle, and Highman and Michael contribute important papers on this subject. Towle[1] reviews widely the literature of anaphylaxis in diseases other than those of the skin, finding in the histories of hay fever a certain support for the view that special susceptibilities may be hereditary; anaphylactic phenomena are especially often met with in gastro-intestinal affections, and he quotes Combe's view that the body has three chief defences against auto-intoxication, viz., the intestinal mucosa, the liver, and the ductless glands. Eosinophilia is regarded by Combe and others as an indication of intoxication, but this view is widely combated.

Two theories of anaphylaxis are examined. The first, the humoral, teaches that the injection of the protein causes the production of antibodies in the blood, and if the same protein is re-injected within a certain time, a reaction takes place between the re-injected protein (antigen) and the antibodies produced by the previous injection of antigen, provided that complement is present. As a result of this reaction between antigen, antibody, and complement, the albumin molecule is broken down, and a toxic product known as anaphylatoxin is formed. If the time between the two injections of antigen is too short to allow of the production of antibodies, there is no anaphylactic shock. A safe period is stated to be within twelve days. The cellular theory postulates that antibodies are held up by the cells, and therefore no symptoms result. When the accumulation reaches a certain degree, even a small extra dose of antigen will produce an explosion. In the specific field of cutaneous tests with foodstuffs, extensively practised in the United States, Towle maintains that while the principle must be accepted, the interpretations at present lack confirmation. Highman and Michael[2] concentrate on the phenomena of skin sensitization, and give the results in 14 cases tested with commercial products (proteins) prepared for anaphylactic tests. The authors assume that these products are reliable, and describe their method as follows. The skin is cleansed with ether, and a minute bloodless excoriation is produced at as many points along the forearm as tests are planned. A drop of decinormal sodium hydrate solution is deposited on each excoriation, and a small quantity of the protein is rubbed in with a fresh wooden applicator for each substance. Controls are made with the alkali. At first only one control was employed, but it was noted that the controls themselves vary; those near the elbow bend being larger than those near the wrist. Thus, it was decided to place four controls at equal distances from the cubital fossa to the wrist in a row parallel to those of the test. If this is not done, accurate readings are impossible, all contrary statements notwithstanding, and it will be observed that the control lesions grow progressively smaller as the hand is approached.

The substances used were suggested in some measure by histories of patients, and were very numerous, including milk, egg, beef, lamb, pork, chicken, veal, various kinds of fish and vegetables, etc. The degree of reaction is measured against the control. It appears within ten to thirty minutes, and shows the following features: a wheal, and a stellate erythematous zone about it. If the wheal equals that of the control, and presents no erythema, it is negative, or at the most +— ; if it is half again as large as the control, it is + positive; if twice as large, ++ ; if three times as large +++ ; or if it is but half again as large and surrounded by erythema, it is ++, and so on. A wheal twice as large as the control, with a marked erythema, is +++ ; and everything over the above is ++++. Of course, these standards are largely ubjective, and each investigator must evolve his own scale.

The reaction may be delayed by as much as one hour, but is discernible usually within fifteen minutes.

The reaction is probably specific in the sense that the substances eliciting positive reactions are the specific pathogenic agents of the disease. Several separate items may be responsible in the same case, and it was noted that there was a certain similarity between the effects produced by substances not generically similar but possibly with a similar chemical architecture (e.g., veal and egg). It was found in many of the cases cited that removal of the offending item or group resulted in cure of symptoms, and a good therapeutic effect was obtained by the administration of suprarenal extract in doses of 5 min., injected hypodermically or put into the conjunctival sac. Anaphylaxis is defined by the authors as the state produced by introducing into an animal a foreign protein which so alters the body that, if within from ten to twenty days a minute quantity of the same substance is introduced, a definite syndrome is provoked. The body cells are altered to become susceptible to a substance not inherently poisonous. This condition has been named ‘ allergy ’ by Pirquet, who has also coined the word ‘ anergy ’ to designate the condition of the sensitized animal in which the re-injection of the antigen is made before the antibodies produced by the previous injection have time to mature. By injecting at intervals too short for anaphylaxis to occur, the animal can be rendered immune. Certain non-protein substances produce phenomena comparable with these, but it is doubtful whether they can be included in the same category.

Probably disturbances of the function of the mucosa of the intestinal tract may result in an increased permeability and absorption of protein poisons which the intact mucosa resists. The absorption of the offending substance must be by the alimentary canal in the great majority of instances, but it is possible that absorption by the skin may be an explanation in a few cases.

The authors discuss urticaria in detail, and favour Samberger's view that the wheal is not an angioneurosis, but the result of an endothelial proliferation, determined by the asphyxiation of the cells in the part affected, which call for increased oxygenation and nutrition. The wheal is a lymphatic skin reaction primarily due to anaphylaxis. Suprarenal extract increases the circulatory rate by narrowing the capillaries, and prevents anaphylactic shock, and it also causes involution of wheals. The authors, however, do well to point out that wheals may be occasioned by causes definitely non-anaphylactic, e.g., by nettle stings, and such eruptions are not influenced by suprarenal extract.

The value of the cutaneous tests is discussed, and the authors think that positive reactions indicate sensitization to certain proteins, while negative results probably often mean that the test for the right protein has not been made.

Engmann and Wander[3] contribute a thoughtful paper on the same subject, and give results of experiments with protein substances of commercial production very much on the same lines as in the papers abstracted above. Several diseases were investigated, the most satisfactory data being obtained in cases of urticaria. With other affections the information obtained by the method was disappointing. It is interesting to note the failure of the tests particularly in acute eczema, which in the authors' opinion is almost always due to external irritants.

Skin Disease in Relation to Internal Disorder.—At a debate[4] on this subject opened by Sir James Galloway at the Medical Society in February, 1921, in which several leading physicians took part, special attention was directed to the eruptions produced by the introduction of alien proteins, the opener postulating two facts in this connection: first, as the result of absorption of proteins alien to the invaded organism, eruptions make their appearance closely similar to the erythema group of skin diseases; second, that these eruptions vary in degree, severity, and time of incidence, and these variations depend on stages of increased or diminished sensibility which may be acquired by artificial methods.

Bacterial infections may generate toxins which have various destructive influences. Amongst the better recognized are the neurotoxic, the thrombotic, and the hæmolytic toxins, and it is also known that they have a special power of damaging the endothelium of the capillaries and the small arterioles. Such poisons arising from any infective focus in the body may act on the tissues in a very direct fashion analogous to the action produced by such toxins as those of the 'venin' group. It is, therefore, not a matter of surprise, given a focal lesion, such as suppurative inflammation of the nasopharynx or a circumscribed empyema of the pleura, that toxins are liberated which will produce damage to the endothelium of capillaries, associated with hæmolytic or thrombotic effects, in certain areas specially liable to damage, and thus cause the manifestations as we see them in exudative erythema.

In the case of disorders of the gastro-intestinal tract, which are apparently so frequently associated with these cutaneous manifestations, the same influence of bacterial origin may be at work. Bacterial or other parasitic toxins escape from the gastro-intestinal tract into the circulation and produce the changes at a distance such as those already mentioned. It is, however, possible that in the case of the gastro-intestinal tract another cause of poisoning may exist—namely, that the damage to the gastro-intestinal tract may permit of protein substances passing into the circulation directly from the food. These proteins do not pass through the stages of normal digestion whereby they are rendered safe and useful to the body, but escape into the circulation more or less in their original form with comparatively unaltered protein molecules, and thus act as alien proteins. There is plenty of evidence of the highly toxic effects produced by the parenteral introduction of alien proteins; substances passing into the circulation from the gastro-intestinal tract in the way suggested may act in a similar manner. It is in this relationship that the studies of the reaction of serum sickness are so suggestive and valuable. The erythematous eruptions which are found associated with gastro-intestinal disturbance resemble closely the eruptions in the skin following the introduction of alien proteins in the form of antitoxic and other alien sera. In the case of both sets of poisons, the toxins of parasitic origin and the alien proteins, the possibility of increased or of diminished sensibility must be borne in mind.

We have, therefore, presented to us the very important suggestion that general or focal infections are capable of admitting into the body toxins producing destructive influences, and also that substances resembling more closely the alien proteins producing the protein reactions—serum sickness and analogous conditions—may also enter into the circulation in visceral disease. Both sets of poisons are capable of damaging the tissues, especially the blood and blood-vessels, in such a way that the diseases of the erythema group may be understood to occur. Many of the clinical phenomena, as the distribution, incidence, and the recurrence of these cutaneous manifestations, can be explained by the possibility of increased or diminished sensibility of the affected organism.

In this connection the diseases labelled erythema nodosum, lupus erythematosus, pemphigus, and pemphigoid eruptions are considered in the light of sensitization to septic intoxications, the interesting suggestion being offered that herpes gestationis, which is commonly regarded as a variety of dermatitis herpetiformis, may be due to absorption by the mother of proteins of embryonal origin to which she has become sensitized. In many cases of so-called gouty eczema, the sclerotic degeneration of the superficial blood-vessels, with the attending malnutrition of the skin, probably explains the eruptions, and the poor success of treating with local drugs. The part played by the nervous system is considered in relation with herpes zoster and syringomyelia.

Disease of the abdominal viscera is frequently found in association with skin disease, notably renal disease; and the assumption is that the same toxin acts at once on the kidney, and the albuminuria is a very important factor in exfoliative skin conditions and may lead to fatal complications. The type of a metabolic disorder which is seen often in conjunction with a skin eruption is xanthoma, and lichen planus also may enter this category.

REFERENCES.—[1]*Arch. of Dermatol. and Syph.* 1920, Nov., 531; [2]*Ibid.*; [3]*Arch. of Dermatol. and Syph.* 1921, March, 223; [4]*Lancet*, 1921, i, 432.

SKIN, EPITHELIOMA OF THE. (*See also* SKIN, CANCER OF.)

E. Graham Little, M.D., F.R.C.P.

Broders[1] has some interesting speculations on the factors which determine the rate of growth of cancers of the skin. He supports MacCarty's view that a cancer is not necessarily degenerative tissue, but the enzyme activity of the cancer cell may cause the death of these cells, as it may cause the death of other cells in the body. Conditions which promote the activity of growth of body cells in general may also stimulate growth of cancer cells. It is interesting to observe that experiments in mice seem to show that mice pregnant before tumour growth occurs resist the growth, a fact which is explained on the supposition that all the energy of the cells is concentrated on the reproductive process, and the tumour is starved. In the same way high feeding may increase the rapidity of growth of cancer cells as it does that of body cells in general.

Cancer cells which show little differentiation are apt to be more malignant than those which show much. On the basis of this observation the author attempts to grade types of epithelioma in four classes of malignancy: that is, if about three-fourths of its structure is differentiated epithelium and one-fourth undifferentiated, it is graded 1; if the percentage of differentiated and undifferentiated epithelium is about equal, it is graded 2; if the undifferentiated epithelium forms about three-fourths and the differentiated about one-fourth of the growth, it is graded 3; if there is no tendency for the cells to differentiate, it is graded 4. The number of mitotic figures and the number of cells with single large deeply-staining nucleoli play an important part in the grading. The paper is founded on the observation of 256 cases of squamous-cell epithelioma of the skin, and is mainly statistical: 8·20 per cent were *Grade* 1, 69·53 were *Grade* 2, 17·18 per cent were *Grade* 3, and 5·07 were *Grade* 4.

Fig. 75 represents an attempt to tabulate the topographical distribution of the growths, and explains itself.

Epithelioma Developing on Lupus Erythematosus.—Wander[2] has collected 110 cases of this combination occurring in the last ten years, and reports 4 new personal cases, all in white people; 3 were over sixty years of age, the fourth was forty-one. All gave the history of long-standing lupus erythematosus. There is no mention of methods of treatment applied for the earlier disease.

The first was a woman, age 82, with a rapidly ulcerating lesion on the scar of an old lupus erythematosus. There was extensive glandular enlargement associated with it. Operation was not attempted on account of her age. *X* rays were applied to the ulcer, with no improvement, and the patient died within six weeks of being seen the first time. The second case occurred in a man, age 60, on a lupus erythematosus which had begun twenty-five years

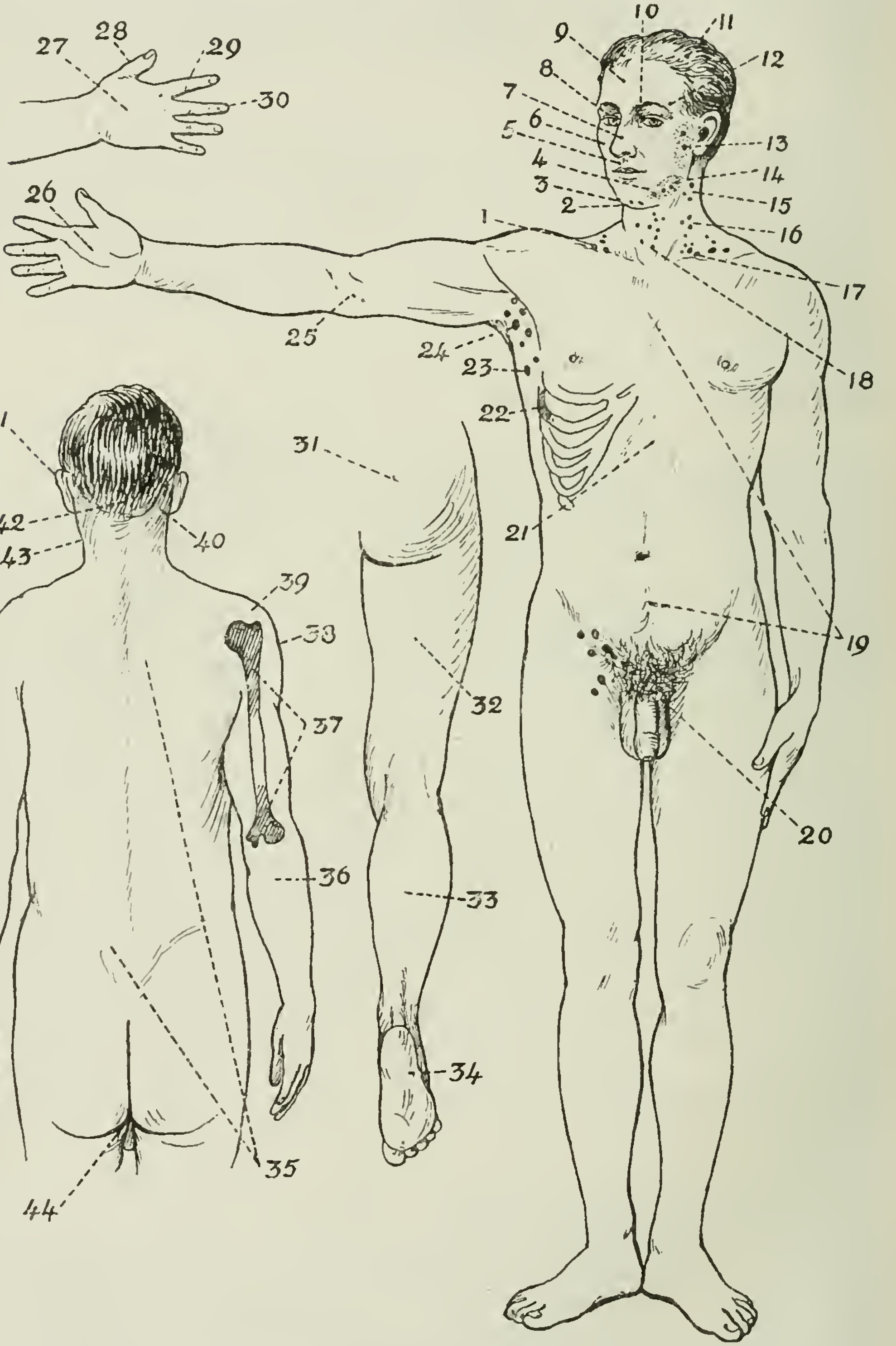


Fig. 75.—Percentages of points of origin in squamous-cell epithelioma of the skin, and percentages of location of metastases. (In the description on p. 393, primary points are indicated by heavy letters and metastases by light letters).

(*Re-drawn by kind permission of the 'Annals of Surgery'.*)

earlier. The case was lost sight of before any serious treatment was possible. He was seen four years later, having used only various ointments in the interval, during which the ulcerated areas had scarred over, but there were nodules of carcinoma at the edge. The patient was again lost sight of, after one application of radium. The third case was also a man, age 60, with ulceration of rodent type on lupus erythematosus of twenty-four years' standing. The man was treated with *x*-ray applications, with temporary improvement but frequent relapses, and finally metastases. The fourth case was a man, age 40, with a history of lupus erythematosus beginning twenty-four years previously. A verrucose growth appeared on the nose, which seemed to disappear completely under radium treatment.

References.—[1]*Ann. of Surg.* 1921, Feb., 141; [2]*Arch. of Dermatol. and Syph.* 1921, Jan., 22.

DESCRIPTION OF *Fig.* 75.

1. Supraclavicular nodes (9·37%)
2. Submental nodes (3·12%)
3. **Chin** (3·51%)
4. Submaxillary salivary gland (12·50%), and lymph nodes (28·12%)
5. **Upper lip** (0·39%)
6. **Cheek** (25·95%)
7. **Nose** (12·50%)
8. **Eyelid** (2·73%)
9. **Forehead** (2·34%)
10. **Inner canthus** (0·39%)
11. **Paristal region** (1·56%)
12. **Temporal region** (9·37%)
13. Parotid salivary gland (25·00%), and lymph nodes (25·00%)
14. **Angle of jaw** (4·25%)
15. Superior deep cervical nodes (15·62%)
16. External jugular nodes (18·75%)
17. Inferior deep cervical nodes (9·37%)
18. Anterior cervical nodes (12·50%)
19. **Thoracico-abdominal region, ventral surface** (1·5 %)
20. Inguinal nodes (15·62%)
21. Chest wall (3·12%)
22. Seventh rib (3·12%)
23. Inferior pectoral nodes (3·12%)
24. Axillary nodes (15·62%)
25. Supratrochlear nodes (6·25%)
26. **Palmar Surface** (0·39%)
27. **Dorsal surface** (6·25%)
28. **Thumb** (1·17%)
29. **Index finger** (2·34%)
30. **Middle finger** (0·78%)
31. **Buttock** (1·17%)
32. **Thigh** (0·78%)
33. **Leg** (2·73%)
34. **Foot** (0·78)
35. **Thoracico-abdominal region, dorsal surface** (0· 8%)
36. **Forearm** (0·39%)
37. Humerus (3·12%)
38. **Arm** (0·78%)
39. **Shoulder** (0·39%)
40. **Mastoid region** (2·34%)
41. **Ear** ([illegible]01%)
42. **Occipital region** (0·39%)
43. **Neck** (6·2 %)
44. **Perineal region** (1·17%)

SKIN, IDIOPATHIC HÆMORRHAGIC MULTIPLE SARCOMA OF.

E. Graham Little, M.D., F.R.C.P.

Frost[1] reports a new case of this rare dermatosis, and with an exceptionally extensive distribution, for in addition to the lower limbs, the common site of the affection, the trunk and upper limbs showed numerous patches. The patient was an Austrian Jew, age 48, and had had the eruption for fifteen months. There was no evidence of disease in the viscera or the blood. The lesions are described as red to brownish, infiltrated, flat nodules from the size of a pea to that of a quarter dollar. The smaller lesions were more erythematous than the larger ones, and those on the extremities were distinctly purplish. Many of the larger lesions were less infiltrated, and there was less discoloration and infiltration in the centre of the plaques. On the hands and feet the lesions had become confluent, forming large, purplish, infiltrated plaques; on each ear, involving chiefly the central portion, was a purplish, infiltrated plaque gradually fading at the border into the normal skin. The lesions on the body elsewhere were sharply demarcated from the surrounding normal integument. The nodules were all fixed to the skin and apparently extended into the deeper layers of the corium. In the left anterior axillary line under the lateral border of the pectoralis major muscle was an egg-sized, hard mass which was freely movable and apparently not fixed to the surrounding structures. In the supraclavicular space on each side was a similar but smaller nodule. There was considerable brawny œdema of the legs, extending almost as high as the knees, and of the hands and lower forearms. There were no lesions in the mouth or pharynx.

The treatment adopted included the giving of **Arsenic** internally and **Radiotheraphy**, and 'considerable improvement' resulted.

Reference.—[1]*Arch. of Dermatol. and Syph.* 1921, Feb., 155.

SKIN, TUBERCULOSIS OF.

E. Graham Little, M.D., F.R.C.P.

Gardiner[1] has analyzed his cases, consisting of 146 males and 209 females, with some interesting results. The age of onset was in most cases before ten years, and rarely after twenty. The site in 71 per cent of both sexes was the face. The nose was affected in 15 per cent males and 30 per cent females. The disease originates with preponderating frequency in glandular infections, no less than 94 out of 200 of the writer's cases giving this history. In 27 cases the disease followed on an eruptive fever ; 17 cases were derived from bone infections ; direct inoculations seemed to account for 27 cases.

Source of Infection. Taken from Age at Onset

Age	Glands		Injury		Vaccination		Fever		Nasal		Bone		Eye	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
Under 1	2	3	0	0	4	0	0	2	0	0	0	0	0	0
1 to 5	8	9	4	3	0	0	10	6	0	0	5	3	0	0
5 ,, 10	11	24	5	0	0	0	2	3	2	5	3	0	0	1
10 ,, 15	8	5	3	1	0	0	0	4	2	5	2	3	0	0
15 ,, 20	3	7	0	0	0	0	0	0	4	6	0	1	0	0
20 ,, 25	1	3	4	0	0	0	0	1	0	2	0	0	0	0
25 ,, 30	1	2	1	1	0	0	0	1	0	2	0	0	1	0
30 ,, 35	0	3	0	0	0	0	0	0	1	1	0	0	0	0
35 ,, 40	0	0	0	0	0	0	0	0	0	2	0	0	0	0
40 ,, 45	0	2	0	0	0	0	0	0	0	0	0	0	0	0
45 ,, 50	1	1	0	0	0	0	0	0	0	0	0	0	0	0
50 ,, 55	0	0	0	0	0	0	0	0	0	0	0	0	0	0
55 ,, 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0
60 ,, 65	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Total	35	59	18	5	4	0	12	17	9	23	10	7	1	1

Tuberculosis of the Lip.—Erwin Zeissler[2] describes an interesting case of tuberculosis of the lip in a Russian immigrant, age 56, suffering from chronic phthisis. The entire lower lip was uniformly enlarged, about twice the size of the upper lip, and indurated to the touch, with several small areas of denuded epidermis. Under glass pressure, minute nodules could be discerned. The inner aspect of the lower lip down to the gingival border showed a superficially ulcerated area about 2 cm. broad with a granular base, sloping edges, and was surrounded by œdematous mucous membrane for some distance on each side. On palpation, the ulcer felt moderately indurated. At the inner aspect of the upper lip near the right commissure was an abruptly excavated ulcer 0·5 cm. in depth with an irregular base. This ulcer felt soft to the touch. Opposite the last lower right molar was a third shallow ulcer, about 1 cm. in circumference, of a similar type. The few remaining teeth in the lower set showed evidence of extensive decay and pyorrhœa. The gums of the lower jaw were spongy, œdematous, and exuded pus on pressure. The tongue, palate, and pharynx appeared normal. A laryngological examination was negative. There was a mass of hard glands in the submental region.

The case had been regarded by a majority of competent dermatologists as an epithelioma. Smears and scrapings from the ulcer showed bacilli indistinguishable from tubercle. Histological examination of tissue from the lip confirmed this diagnosis. The treatment adopted included general measures, and application of filtered **X Rays** to the lip and submental glands. The swelling had diminished appreciably, and the ulcer had healed, when the patient disappeared from observation.

References.—[1] *Edin. Med. Jour.* 1921, June, 374 ; [2] *Arch. of Dermatol. and Syph.* 1921, Jan., 12.

SLEEPING SICKNESS. (*See* TRYPANOSOMIASIS.)

SMALL-POX. (*See also* VACCINATION.)

J. D. Rolleston, M.D.

J. N. Force,[1] special expert of the United States Public Health Service, shows that small-pox is extremely prevalent in the United States by the following statistics of cases reported to the Californian State Board of Health during the years 1916–20. In 1916 there were 248 cases ; in 1917, 329 cases ; in 1918, 1100 cases ; in 1919, 2053 cases ; and in 1920, 4486 cases ; the last figure representing an eighteen-fold increase of the disease in five years. Study of the age distribution showed that in 1916 half the cases occurred before the age of 22, in 1918 half occurred before 20, and in 1919 half before 17. In 1916 the incidence among children per thousand of total population was only slightly greater than for adults ; in 1919 the case-rate for children was twice that for adults. Force attributes this remarkable increase in the disease, especially among children, to two chief causes, errors in diagnosis and neglect of juvenile vaccination. Definite histories as to vaccination were obtained in 4226 of the 4486 cases notified in 1920. Only 1 per cent had been vaccinated during the five years immediately preceding the attack of small-pox, 7 per cent had been vaccinated more than five years before, and 92 per cent had never been vaccinated.

H. D. Chapin[2] records an outbreak in Jamaica of *Kaffir-pox*, a disease which is also known by the names of epidemic varioloid-varicella, alastrim, West Indian modified small-pox, and Kaffir milk-pox. According to Castellani and Chambers, whom he quotes, Kaffir-pox differs from chicken-pox in (1) confluence of vesicles in certain cases, (2) its frequency among adults, (3) partial protection by vaccination ; and from small-pox by (1) its low mortality (1 or 2 per cent), (2) lesser severity in children than in adults, (3) absence of secondary fever in children, (4) occurrence after recent successful vaccination, although vaccination is in some degree protective, (5) possibility of successful vaccination after an attack.

R. H. Kempton and J. P. Parsons[3] report a fatal case of combined purpura variolosa and purpura hæmorrhagica pustulosa in a woman, age 21, who had been vaccinated without success for the first time three months previously. The hæmolytic streptococcus was present in the circulating blood as early as the first day of the disease, and the writers think it probable that it was present in the blood even before the symptoms of onset. It apparently developed synchronously with the variola virus, and continued throughout the course of the disease, a positive culture having been obtained on the thirteenth day, and death taking place on the day following. In spite of the severe secondary infection the patient overcame her small-pox, but succumbed when pneumonia, probably of the hæmolytic streptococcus type, developed on the twelfth day of disease. The case thus confirms the opinion of Ewing, Councilman, and Maurice that streptococcus infection is of more importance in the fatal termination of variola than the variola virus itself.

According to M. Vargas,[4] who reports a case in a seven-year-old child, *albuminuria* in small-pox may occur at an early or late stage of the disease. Early albuminuria, which appears in about 25 per cent, develops during the stage of invasion and disappears in the eruption period, without possessing any prognostic importance. Albuminuria appearing in convalescence is less frequent, occurring in about 10 per cent, but is more serious, being accompanied by anasarca, headache, convulsions, and uræmia, and is a manifestation of glomerular nephritis.

REFERENCES.—[1]*Modern Medicine*, 1921, 177 ; [2]*Med. Record*, 1920, i, 553 ; [3]*Arch. of Internal Med.* 1920, ii, 594 ; [4]*La med. de los niños*, 1920, 1.

SNAKE BITE.

Sir Leonard Rogers, M.D., F.R.C.P., F.R.S.

R. Knowles[1] records a résumé of the work done in India by Acton and himself from 1912 to 1914. By timing the deaths after the injection of measured doses of venoms into many hundred rats, they worked out parabolic curves, and then allowed snakes to bite rats and estimated from their curves the approximate amounts of venom ejected at a single bite by freshly caught snakes, which gave much more venom than those kept some time in captivity. They concluded that cobras eject about 200 mgrm. of venom measured after drying, or about 14 minimal lethal doses for a man, and sometimes much more ; the king cobra on account of its great size is still more deadly ; the common krait is very deadly in spite of its small size, on account of the great toxicity of its venom ; the banded krait less so ; while the Russell's viper bite is often recovered from with some loss of tissue due to local gangrene, and the *Echis carinata* and the pit vipers are rarely fatal to man. They also carried out extensive experiments regarding treatment, and concluded that mechanical measures, such as ligature, only retard death in colubrine poisoning, very early **Amputation** alone being effective ; but **Ligature** is of more use in viper bites ; and incision and forcible expression of the venom was of very little use. Some 200 chemical agents were tested experimentally, the curves that they had worked out helping in estimating the retarding effect of any agent in prolonging life by destroying a part of the injected dose. **Oxidizing Agents,** such as chlorates, permanganates, and hydrogen peroxide, and, still better, **Soluble Salts of Heavy Metals,** especially of gold, platinum, palladium, mercury, and zinc, gave the best results ; injection in solution was more effective than incision and rubbing in the crystals, but they must be used before one minimal lethal dose has entered the circulation, which may be in about fifteen minutes in man.

REFERENCE.—[1]*Trans. Roy. Soc. Trop. Med. and Hygiene,* 1921, 71.

SNOW BLINDNESS. (*See* EYE AFFECTIONS.)

SPASMOPHILIA. (*See* LARYNGOSPASM.)

SPINAL ANALGESIA. (*See* ANÆSTHETICS.)

SPINE AND SPINAL CORD, AFFECTIONS OF. (*See also* NEUROLOGICAL SURGERY.)

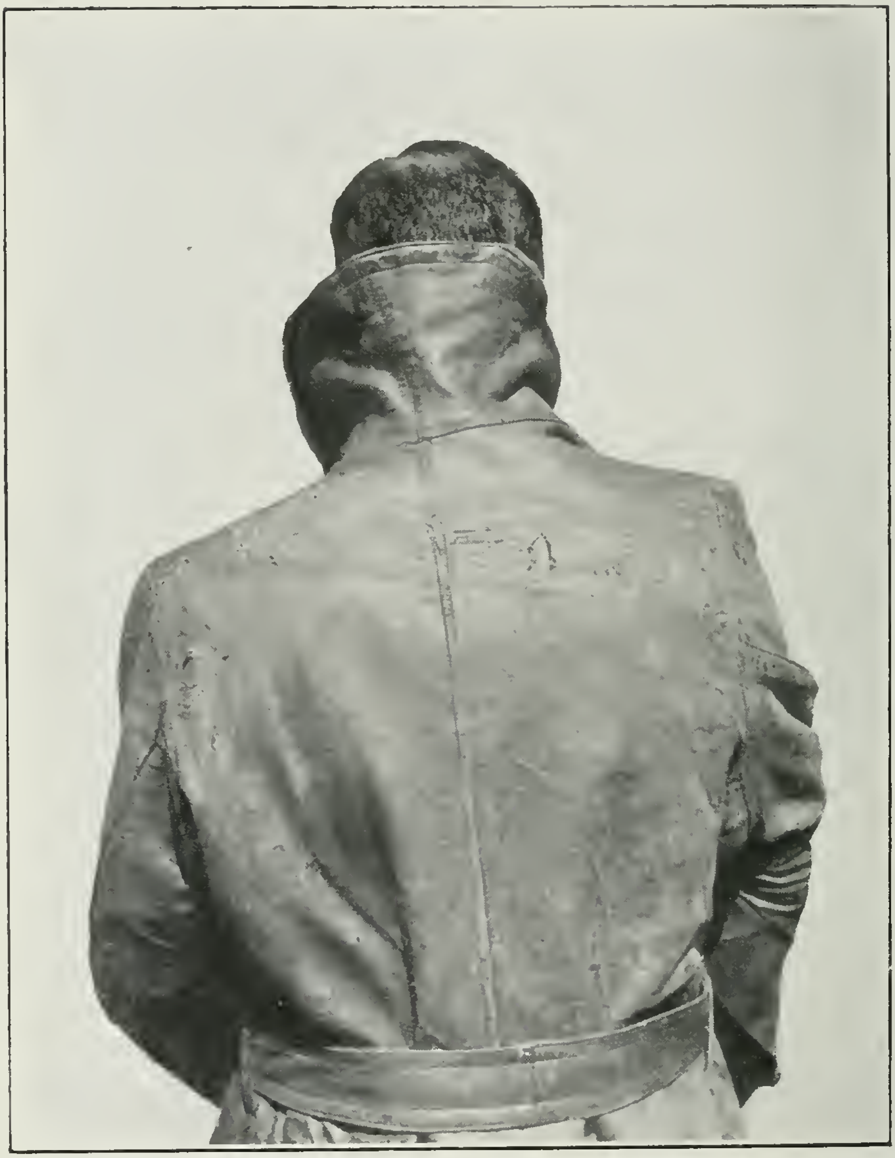
J. Ramsay Hunt, M.D.

Compression Fracture of the Vertebral Bodies with Delayed Symptoms (Kuemmel's Disease).—Baker[1] states that this disease is more frequently seen in neurological than in orthopædic clinics, and is characterized by the following features : spinal injury, with temporary symptoms of short duration and no local evidence of diagnostic importance, and subsequent delayed symptoms of pain, disability, and local signs of bony injury, especially kyphosis.

In 1895, Kuemmel presented 5 cases of this type of spinal lesion, with a discussion of the characteristic symptoms. In his series the injury was usually the result of a fall. Local pain was referred to the dorsal spine. The injury was not usually of such a character as to present signs of spinal-cord lesion. The essential features at the first observation were pain, more or less localized over some point in the spine, limitation of motion of the type seen in muscle injury, and a disability period lasting perhaps but a few days. The subsequent history, however, characterizes the type of lesion. At a later period, varying from weeks to months, without history of a second injury of like nature, the patient develops pain in the back at the site of the former pain, with increasing disability. On examination there will be found a localized tenderness over the spinous processes at the point of previous injury, with more or less marked local prominence of one of the spinous processes. This latter marks a point

PLATE XXXII.

SPINAL CONCUSSION: HETERÆSTHESIA



Photograph of aviator's leather coat, showing marks made by driving-band of anti-aircraft shell.

Plates XXXII, XXXIII by kind permission of the 'Journal of Neurology and Psychopathology.'

about which there is some limitation of motion. Kuemmel was inclined at first to attribute this condition to a traumatic osteo-arthritis of the spine, but later came to consider it probably a type of fractured spine.

Henle believed the condition to be due to a traumatic spondylomalacia. Shede stated that it might appear in fracture of the spine, and Hocher, Trendelenburg, Oberst, and E. Fraenkel considered it as a type of compression fracture of the vertebral body.

Since the first description the same type of case has been occasionally mentioned, but not until the *x* ray had been developed and the technique improved to a fine point have we been able to check this syndrome with the actual organic lesion which seems to be the basis of all of these cases.

It is noteworthy that most of the reports of the type of case under discussion assume that the diagnosis could have been made within the first few days following injury. That it has not, is partly due to the fact that the cases sometimes appear in one clinic at the initial injury and in another at the subsequent examination. This group of cases is reported with the idea that perhaps this is not the only reason for failure of diagnosis at the time of injury. This theory is supported by 4 cases which indicate that the initial röntgenogram was negative for bony lesion, since on active treatment was undertaken. There is probably a type of compression fracture of the spinal bodies which is apparently benign at first and gives no *x*-ray evidence of a bony lesion, but in which, at some later period, definite bony changes develop, and the diagnosis can be easily made by certain distinctive signs, including the typical *x*-ray picture.

If we are right in believing that such fractures exist, then we may assume that there must be such cases included in the long list of traumatic neuroses and 'railway spines' that are so frequently found in our large clinics. And in like manner the failure of diagnosis involves a large problem in the accident insurance in relation to such cases.

Baker strongly urges the earliest possible diagnosis. This should include frequent examinations, physical and *x*-ray, for the weeks or months following the injury. Such a procedure would give the first evidence of coming bone destruction, and would afford, by proper treatment, a chance to ward off actual collapse of the fractured centrum. If such observations were obtained, further light might also be shed on the pathology in these cases. The final prognosis will surely depend on the time at which diagnosis is made and treatment begun. Under the author's observation, even the cases which have gone to collapse of the centrum have been restored to a point where symptoms have disappeared and signs only remained.

The treatment directed to the spine will vary somewhat, but the rule will be **Adequate Fixation** over an extended period. This has been accomplished with satisfaction in some clinics by the use of plaster. Some authors, in the recent literature on the subject of compression fracture, advocate bone-grafting.

Heterœsthesia.—This is an interesting form of sensory disorder which has been observed after concussion injuries of the central nervous system. It consists in this, that if a constant stimulus (such as that given by the scratch of a pin or by a mild faradic current) is moved across the skin, the subject states that it feels stronger or weaker at certain points. These points, when carefully mapped out, are discovered to lie on lines which correspond to the boundaries of the segmental or radicular areas of distribution of the afferent nerve-fibres. T. Graham Brown[2] describes its manifestations in a case of concussion of the spinal cord, resultant on a graze, by a live shell, of an airman in flight. At the C.C.S. it was found that his leather coat was marked across the shoulders by the driving-band of an anti-aircraft shell (*Plate XXXII*). The patient had great difficulty in moving his arms, the paresis being greater in the case of the right upper limb than in the left. The shoulders were badly bruised, especially over the upper halves of the two scapulæ. Across this region, and corresponding exactly with the marks on his coat, were a number of long parallel wheals. There was pain in the shoulder and neck, and painful tingling in the upper limbs. Apart from slight nystagmoid movements of the eyeballs in the extreme lateral positions, and a marked tremor of the protruded tongue, the cranial nerves were normal. The pupils were dilated.

With regard to sensation, there was little abnormal to be detected. Slight hyperæsthesia and hyperalgesia were present in the upper limbs, particularly in the areas of distribution of the eighth cervical and first and second thoracic dorsal spinal roots. This was more marked in the right than in the left limb. No area of anæsthesia or analgesia could be detected. The kinæsthetic sensations were apparently normal. There was no astereognosis. Compass tests were fairly accurate. Localization could not be tested. Lower limbs were apparently normal. The most interesting sensory disturbance was the presence of 'heteræsthesia'.

The phenomenon is interpreted as follows: The state of 'excitability' of different parts of the nervous system is known to vary under different conditions. The primitive segments of the spinal cord may be considered, in a sense, as different individual parts of the nervous system. Complex co-ordinated acts which involve many different spinal segments might be rendered inefficient if the states of 'excitability' of these different spinal segments varied more or less fortuitously amongst themselves. As this inefficiency does not normally occur, it may be argued that a function of the co-ordinating mechanisms which integrate the different parts of the nervous system is the control of states of excitability, so that different segments are kept properly in tune. As the great co-ordinating mechanisms have their chief centres towards the head end of the animal, these co-ordinating paths—whether propriospinal or passing from cerebral or mid-brain centres to other parts of the nervous system—are most probably descending. A concussion may for a time throw this mechanism out of gear, or a lesion (as in partial compression of the spinal cord) may interrupt the descending tracts. In either condition the lower segments may pass out of control (or out of full control) of the co-ordinating centre, and may assume different states of 'excitability' more or less independently. In these circumstances the values of equal stimuli may be different when the in-going nerve-impulses which they engender impinge upon different segments. Hence the phenomenon of 'heteræsthesia'.

REFERENCES.—[1]*Surg. Gynecol. and Obst.* 1920, Oct., 359; [2]*Jour. Neurol. and Psychopathol.* 1920, May, 54.

SPIROCHÆTOSIS. (*See* JAUNDICE, INFECTIVE; RAT-BITE FEVER.)

SPLEEN, SURGERY OF.

E. Wyllys Andrews, A.M., M.D., F.A.C.S.

An exhaustive paper by Moynihan[1] cannot be adequately reviewed in the space allotted, and only a few points can be noted. The status of *splenectomy in the various blood dyscrasias* is given as follows:—

In the leukæmias the progress of the disease is not affected by removal of the spleen. The mortality of the operation is very high. If the spleen is first reduced to reasonable size by radium or *x*-ray treatment the risk is far less, but the only good accomplished is the mechanical relief from the weight of the organ.

In Hodgkin's disease the spleen is rarely of great size, and its removal is not indicated. The other lymphoid tissues are also involved, and nearly always to a greater extent than the spleen.

In splenic anæmia the results of surgery are the best. Especially in the earlier stages, if not complete cures, at least relief for very long periods may be expected. Even in the later stages marked benefit follows.

Hæmolytic jaundice responds better still. In a great number of cases no treatment at all is indicated, as the condition is not incompatible with life. If, however, the hæmolysis is extreme and debilitating, and treatment is necessary, splenectomy brings about a complete and permanent cure.

The greatest problem is in pernicious anæmia. This is not only the commonest of these diseases, but the results are most variable. The operation should not be performed unless the patient is in good condition—i.e., either during a remission, or after repeated whole-blood transfusions have brought the hæmoglobin and red cells up to somewhere near normal. Of course when this has been done it is always a question if any improvement which takes place is due to the operation or to the preliminary treatment. Certainly we can say that no lasting cures are thus effected, but by some it is claimed that the temporary improvement is so marked that the operation is justified. The following figures are from the Mayo Clinic. There were 53 cases, with 3 deaths, a mortality of 5·6 per cent; 5 patients were living between four and five years after operation; 11 patients were living between three and four years after operation; 22 per cent of patients lived two and a half times as long as the average.

Pfanner[2] points out the necessity of *splenectomy in injuries of the spleen.* The danger from conservative treatment is very great. Even if the hæmorrhage is arrested for the time by a pack, secondary bleeding is very likely to occur. There is very little tendency to firm cicatrization in the spleen pulp, and the only way in which healing can take place is by the ingrowth of the lacerated edges of the capsule. Infection of a wound of the spleen is very likely, and usually gives no signs until it is far advanced, as leucocytosis is absent.

Hamilton and Boyer[3] report two cases of *hæmorrhagic cysts of the spleen successfully cured by splenectomy.* These cysts usually give no signs except the tumour, and the diagnosis is not always possible except on the operating table. The normal blood-picture accompanying a large swelling of the spleen is suggestive. Blood cysts are usually single, and lymph cysts multiple. Thirty-one cases from the literature are cited to show that splenectomy is the operation of choice; 6 of these were punctured with the cautery, with 2 deaths; 9 were incised and drained, with 1 death; of 4 patients in whom the cyst alone was resected, 1 succumbed; of 15 splenectomies, all were successful.

References.—[1]*Brit. Jour. Surg.* 1921, Jan., 304; [2]*Arch. f. Orth.* 1920, xviii, 206; [3]*Ann of Surg.* 1921, Jan., 58.

SPRUE.

Sir Leonard Rogers, M.D., F.R.C.P., F.R.S.

T. R. Brown[1,2] reports five cases of sprue treated in the United States with 5 to 10 gr. of **Pancreatic Extract** and 20 to 40 gr. of **Calcium Carbonate** or **Calcium Lactate** three times a day two hours after meals, with disappearance of the symptoms, including the soreness of the tongue as long as the ferment was taken, but relapse as soon as it was left off. Careful analyses had shown complete absence of the pancreatic ferments from the digestive canal. A. Castellani[3] advises large doses of **Sodium Bicarbonate** orally, beginning with 1 drachm and increasing to 3 or more three times a day, but has not found **Pancreatin** of use in the acute stages, though it may be useful later. Also he has given 10 to 20 oz. of 2 to 4 per cent bicarbonate of soda solution intravenously daily, or every other day, up to 12 injections, and he thinks the patients improved more rapidly than with dietetic treatment alone.

References.—[1]*Amer. Jour. Med. Sci.* 1921, April, 501; [2]*Jour. Trop. Med. and Hygiene,* 1921, 90; [3]*Brit. Med. Jour.* 1921, i, 338.

SPUTUM, CLINICAL PATHOLOGY OF.

O. C. Gruner, M.D.

Bezancon and De Jong[1] lay great stress on the cytological and chemical examination of the sputum. It is as important, they claim, to examine the sputum cytologically for asthma cases as it is to examine it for tubercle bacilli in suspected cases of that disease. Eosinophilia is an almost absolute sign of asthma. Charcot-Leyden crystals are too rarely found to be of use. Albumin is absent in the sputum of true asthma. Men over 50 who have attacks of nocturnal dyspnœa may be the subjects either of asthma or of cardiovascular disease. The presence of eosinophilia in the sputum decides between the two. So, too, when attacks of shortness of breath arise in cases of chronic bronchitis and emphysema with sclerosis of the lungs, these are certainly not asthmatic if there is no eosinophilia.

Reference.—[1] *Bull. de l'Acad. de Méd.* 1920, lxxxiv, 253.

STATIC OR POSTURE SYSTEM, THE: (Postural Hypertonus; Tonic Rigidity; Hypertonus and Tonic Fits).

J. Ramsay Hunt, M.D.

In the last few years there has gradually accumulated considerable evidence in favour of a second system in relation to motor function. In a previous paper the reviewer presented at some length the evidence in favour of a dual efferent system. According to this view, motility is subserved by two components, each represented throughout the entire efferent nervous system by separate neural mechanisms which are physiologically and anatomically distinct. One of the components is the movement proper, which is subserved by the *kinetic system* (motion-system). The other represents that more passive form of contractility which we recognize in tonus, posture, attitude, and equilibrium. This posturing or static function of the efferent system, he thinks is subserved by separate neuromuscular pathways, the *static system* (posture-system). The term static is used here to designate that peculiar property of the striated muscle fibre by which it becomes fixed in posture. In the reflex nervous system this is manifested by postural tonus, and at the higher levels by the various postures and attitudes.

There are many reasons for the assumption that the kinetic system is related to the anisotropic.discs, and the static system to the sacroplasm of the muscle fibre, as these elements differ in structure, innervation, mode of contractility, and metabolism. There are also reasons for the assumption that the transformation of movement into posture is effected by fixation of the sacroplasm, which thus converts the contractile muscle fibre from a kinetic into a static mechanism.

According to this conception, then, movement is subserved by a kinetic, and posture by a static, mechanism, the two systems working together in harmony. For every movement starts from posture and terminates in posture, posture following movement like a shadow. At the same time, the postural mechanism would exercise a stabilizing and steadying influence upon the course of movement itself.

Relation of the Static or Posture System to Hypertonic States of the Skeletal Muscles.—These hypertonic conditions include such disorders of muscle tone as the spastic state, the muscular rigidity of paralysis agitans, decerebrate rigidity, and the tonic or postural spasms, and Ramsay Hunt[1] considers the relationship of the static system thereto.

Motility, as it is observed in animal life, may be divided arbitrarily into three distinct groups, viz., reflex, automatic-associated, and isolated-synergic or dissociated types of movements. All of these forms of movement are intimately associated with that other component of motility which we term posture. And the same postural groups may be recognized as in the classification of movement, viz., reflex posture, automatic-associated postures, and isolated-synergic types of posture, corresponding to their respective motion mechanisms.

The essential integrating and correlating mechanism for the control of static motility he believes to be the cerebellum. Afferent impulses from the periphery and efferent impulses from the cerebral cortex pass to this organ before their final distribution by way of the cerebello-spinal system to the posturing or static mechanism of skeletal muscles. The cerebellum presents phylogenetic evidences of two great divisions, a paleocerebellum and a neocerebellum, which correspond to similar divisions of the cerebrum. The paleocerebellum receives impulses directly from the spinal cord, which pass to its central portion and constitute the vermian system. The neocerebellum receives impulses from the cerebral cortex, which pass by way of the pons varolii to the cerebellar hemispheres, and constitute the hemispheric system. The older cerebellum stands in relation to what may be termed the *paleostatic system*, which controls the older static or postural functions of 'automatic and associated type'. It takes its origin in the older nuclei of the vermis cerebelli (N. fastigii, globosus, emboliformis). The cerebellar hemispheres, on the other hand, regulate the higher postural functions of motility through the medium of a neostatic system, which takes its origin in the cells of the dentate nucleus. The neostatic system is controlled from the cerebral cortex by special tracts which connect the various regions of the cerebral cortex (frontal, parietal, temporal, and occipital) with the dorsal and ventral nuclei of the pons varolii, and thence to the opposite hemisphere of the cerebellum.

The Static System and Postural Hypertonicity of the Skeletal Muscles.—As we have seen, there are as many types of posture as there are of movement, and with corresponding development of neural mechanisms. We must therefore recognize the existence of special fibres in the cortical, capsular, crural, cerebellar, pontile, bulbar, spinal, and peripheral divisions of the nervous system to carry out this static or postural function, corresponding to homologous systems for the kinetic or motorial function.

When some portion of the kinetic system is injured, paralysis immediately results; if the injury takes place in the central nervous system, the lower motor centres are released from control, and a characteristic postural rigidity develops. This peculiar over-action of certain muscles takes place in response to the principle that destruction of a higher centre releases the lower kinetic mechanisms from control. When this has taken place, as after all other forms of movement, the motion-complex becomes fixed in posture, and we have produced that curious paradox of a paralyzed centre above and a functioning centre below, which has expressed itself in terms of *postural hypertonus.*

TYPES OF POST-PARALYTIC POSTURAL HYPERTONICITY.—Many different types of postural hypertonus following paralysis may be recognized, which depend upon the nature and localization of the lesion within the central nervous system. The more important of these are the spasticity of pyramidal tract disease; the muscular rigidity of paralysis agitans; the decerebrate rigidity of mid-brain section; and the postural hypertonic effects of transverse lesions of the pons, medulla, and spinal cord.

Cortical or Pyramidal Types (Spasticity).—One of the most characteristic symptoms of organic disease of the central nervous system is spasticity, or spastic hypertonicity of the skeletal muscles. The affected muscles, while weak or paralyzed, are in a state of over-action and postural fixation, which is dependent upon the over-activity of subordinate kinetic and static centres.

Any injury of the neokinetic or corticospinal system is followed by paralysis of the isolated-synergic movements of cortical origin and release of the lower motor mechanisms of the spinal cord. This is commonly referred to as a loss of cerebral inhibition. In spasticity the kinetic and the static systems are both in action. There is a kinetic discharge which is accompanied by a postural fixation. The characteristic attitude and postural deformities of the purely spastic type of hemiplegia are therefore caused by postural hypertonic fixation resulting from paralysis of the corticospinal pathways (pyramidal system), and the over-activity of the corresponding spinal mechanism.

Striatal or Pallidal Types of Posture Hypertonus (Paralysis agitans rigidity).—The rigidity of paralysis agitans is a postural hypertonicity resulting from paralysis of the pallidal system of the striospinal pathway. In previous studies of paralysis agitans this point of view has been presented, together with evidences showing that the efferent motor system of the corpus striatum (pallidal system) represents an internuncial common pathway for the passage of motor impulses for automatic-associated types of movement (paleokinetic system).

The characteristic attitude and postural deformities of this affection present many points of difference from those associated with the spastic state. There is the mask-like expressions of the face, the peculiar attitude of head, trunk, and arms, and the characteristic position of the hand and fingers. The distribution of the palsy and associated muscular rigidity differ essentially from that observed in the spastic state.

Pallido-Pyramidal Types (Spastic rigidity).—The proximity of the corpus striatum (pallidal system) to the internal capsule (pyramidal system) is such that simultaneous involvement of both structures is not uncommon. Indeed, in vascular lesions of the basal ganglia, it is probable that pure forms of either pyramidal or pallidal palsy are quite rare, and that a combination of the two types is the more common. Involvement of both systems, the pallidal and pyramidal, produces a *spastic-rigid* state which combines in varying degrees the characteristics of both types of postural rigidity.

Mid-brain or Paleocerebellar Type (Decerebrate rigidity).—Another type of hypertonicity, which has awakened considerable interest and investigation, is the decerebrate rigidity of Sherrington. This is a peculiar state of muscular rigidity which corresponds to the automatic-associated posture of standing, and is produced by a section through the mid-brain at the level of the anterior colliculi. A mesencephalic transection at this level severs the pyramidal tracts (neokinetic system), the pallidal tracts (paleokinetic system) as well as the cortico-ponto-cerebellar tracts (neostatic system). The various subordinate centres of the pons, medulla, and cord, both kinetic and static, are released, and the skeletal muscles assume the postural rigidity of standing which is characteristic of this level.

As the older static system of the cerebellum (paleocerebello-rubrospinal system) for the control of automatic-associated types of posture is still functioning, retaining its afferent connections with the spinal cord and the efferent with the red nucleus, the automatic posture of standing, characteristic of decerebrate rigidity, is maintained. When the section is carried below the red nucleus, which severs the paleostatic system, the typical decerebrate posture no longer appears, and the other types of postural reaction make their appearance (pontine and bulbar). Decerebrate posture is also abolished by section of the superior peduncles of the cerebellum, which would sever the connection between the efferent cerebellar system and the red nucleus.

Decerebrate rigidity may, therefore, be regarded as the postural expression of paleostatic activity, which develops after the elimination of cortical and striatal inhibition.

Spinal Types (Paraplegia in flexion).—A transverse lesion of the cord would sever all of the long projection systems, both static and kinetic, and release its various intrinsic spinal reflex mechanisms. In response to this loss of the higher inhibitory control, the characteristic reflex of flexion develops, which becomes fixed in postural hypertonus, the extreme expression of which is 'paraplegia in flexion'.

An extensor type of spinal paralysis is also encountered (paraplegia in extension). This form is characteristic of pyramidal tract disease, and is merely the spinal expression of the *pyramidal* type of hypertonus, as observed in purely spastic states.

Muscle-Tonus, Tonic Rigidity, and Tonic Fits.—This is considered in some detail by Purves Stewart.[2] Ordinarily our voluntary muscles, even at rest, are in a state of slight tonus, a sort of braced-up condition. This muscle-tonus is a reflex affair—that is, it is dependent, primarily, upon the integrity of the spinal reflex arc.

Diminished Muscle-Tonus: Hypotonia.—A lesion interrupting any part of this spinal reflex arc will cause, among other phenomena, loss of muscle-tonus.

Increased Muscle-Tonus: Rigidity.—The opposite condition of excessive reflex activity with increased muscle-tonus may arise from irritative conditions in the reflex arc. Sometimes the irritation is in the afferent limb of the arc, as can be easily observed in the localized rigidity of the muscles around a painful or inflamed joint or the localized abdominal rigidity of an inflamed appendix. It may also result from irritative conditions of the anterior cornual cells—for example, in poisoning by strychnine or by the toxin of tetanus, although in tetanus, as we shall see later, other factors are probably concerned.

Pyramidal and Extra-Pyramidal Tracts Influencing Muscle-Tonus.—All the movements of our voluntary muscles are executed through the anterior cornual cells of the spinal cord. These receive two different varieties of motor impulses from the brain. The first class of impulses are voluntary motor impulses, from the pre-Rolandic cortex, travelling down the brain-stem along the pyramidal tracts. The second class are involuntary non-pyramidal impulses, from subcortical motor centres (such as the corpora striata, the red nuclei, the accessory vestibular nuclei of Deiters, etc.), travelling along subcorticospinal tracts (such as the rubrospinal in the lateral columns, the vestibulospinal in the anterior columns, etc.).

The spasticity due to pure pyramidal disease—for example, in ordinary hemiplegia—is produced by the unopposed non-pyramidal motor tracts. But on the other hand, in the spasticity due to pure extra-pyramidal disease (for example, in paralysis agitans, in progressive lenticular degeneration, etc.), automatic movements, such as those of swinging the arm in walking, blinking the eyelids, certain emotional movements of the face, etc., are diminished or lost, and yet the patient, owing to integrity of his pyramidal tracts, can still perform all ordinary voluntary movements with his spastic muscles.

Decerebrate Rigidity.—When this is done experimentally in animals, by transection through the brain-stem in the mesencephalon, the result is to produce so-called 'decerebrate rigidity', in which the animal's limbs, both upper and lower, are rigidly extended, whilst the neck and whole spinal column, right down to the tail, are tonically hyperextended with retraction of the head. We note particularly that this lesion is a purely destructive or 'negative' lesion.

In rare cases in human patients we may observe a fairly complete reproduction of acute decerebrate rigidity, from unopposed activity of the subcortical motor centres. Decerebrate rigidity in man is the result of a destructive lesion, usually a hæmorrhage, in the mid-brain. This hæmorrhage often spreads at the same time into the cerebral ventricles. It has been suggested that it is the intraventricular site of the hæmorrhage which is the cause of the decerebrate rigidity, but the author states that he has repeatedly observed cases of extensive intraventricular hæmorrhage in which there has been no rigidity whatever. It therefore seems to him probable that some other factor, such as œdema of the brain-stem, must be the decisive one in cutting off the cerebral pyramidal impulses and leaving the subcortical centres uncontrolled.

Acute decerebrate rigidity is usually a terminal phenomenon in a dying patient

Cerebellum and Muscle-Tonus.—The fundamental function of the cerebellum is that of muscular synergia or co-ordination. For the efficient performance of co-ordinated muscular acts a certain degree of muscle-tonus is necessary. The cerebellar cortex is mainly a receiving platform for efferent, cerebellopetal impulses, for example, those of equilibration from the semicircular canals, also the proprioceptive impulses from muscles and joints, impulses which normally do not rise to consciousness, although when they are disordered acute discomfort is at once felt. The motor centres of the cerebellum are located mainly in the intracerebellar nuclei, including the dentate, roof, and emboliform nuclei. These nuclei exercise their influence upon the anterior cornua and the voluntary muscles, not directly, since there are no direct, efferent, cerebellospinal paths leading down to the spinal cord.

Destructive or Negative Cerebellar Lesions.—If the cerebellum is experimentally destroyed, the tonus of the voluntary muscles is at once diminished. In unilateral cerebellar lesions this loss of tonus is confined to the ipsilateral limbs and trunk. The affection of the trunk muscles in unilateral lesions of the cerebellum is dramatically shown by the fact that the tonic action of the contralateral muscles being now unopposed, the animal rotates around its own long axis in a screw-like fashion. In a case of destruction of the right half of the cerebellum this rotation is in the direction of screwing in a screw; in left-sided lesions the direction is reversed (the animal's head representing the head of the screw). Destruction of the anterior part of the middle lobe, or vermis, of the cerebellum, affects the tonus of spinal muscles on both sides, so that in destruction of the front part of the vermis the animal falls forwards, whilst if the posterior part of the vermis is removed the animal falls backwards.

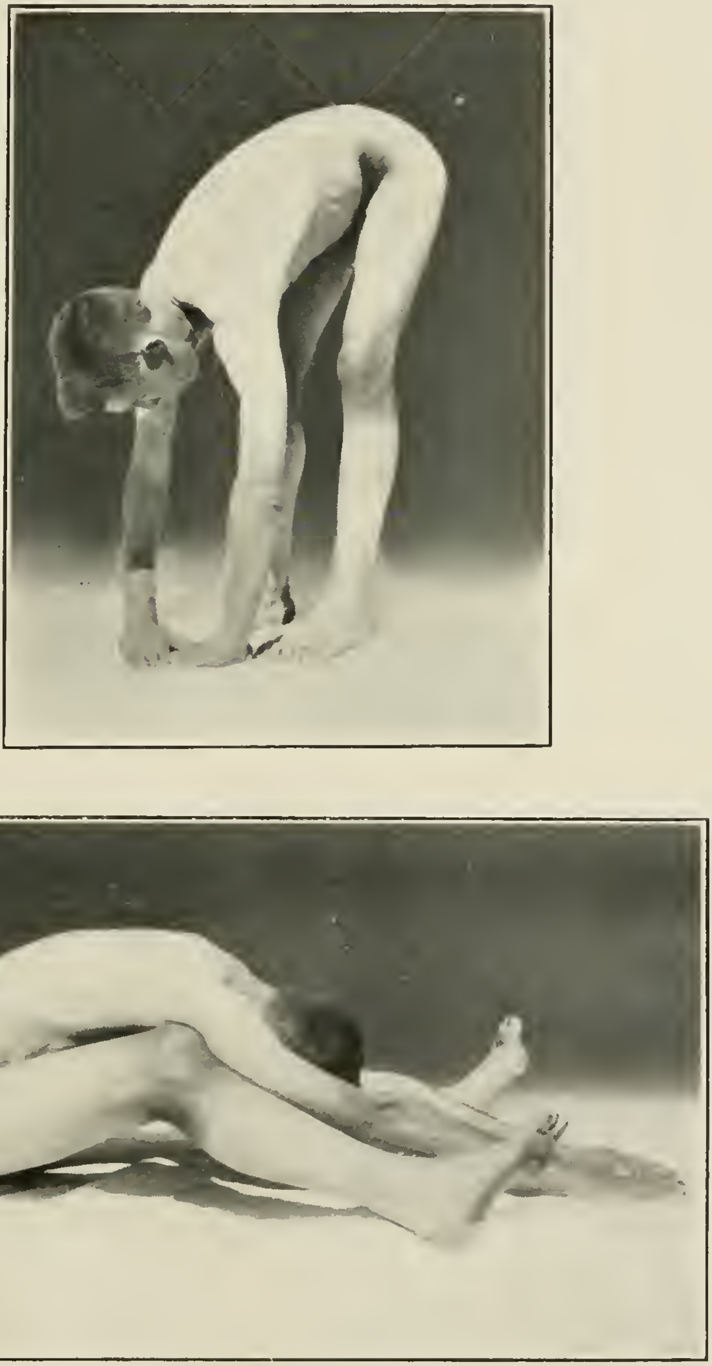
Irritative or Positive Cerebellar Lesions.—Lastly, we have to consider the effects of irritative or 'positive' lesions of the cerebellum. These will increase muscular tonus and produce tonic rigidity of the affected parts. The mechanism through which this is effected is probably by means of intracerebellar nuclei, not the cerebellar cortex.

Tonic or Cerebellar Fits.—In rare cases we may come across rigidity in man from irritative cerebellar lesions, producing a variety of 'tonic fits'. In these so-called cerebellar fits the posture of the lower limbs in extension is what we have already described, but that of the upper limbs is not quite the same as in ordinary decerebrate rigidity from a negative or destructive lesion of the brain-stem above the red nuclei. In irritative cerebellar lesions the typical hyperpronation of the forearms is often absent.

Hypotonia in Dementia Paralytica.—An example of this unusual condition (*Plate XXXIII*) is described by R. M. Stewart.[3] The case was remarkable in that a very striking degree of hypotonia was accompanied by scarcely any other characteristic signs of tabes dorsalis. Hypotonia or diminution of muscle tone can be observed in different affections of the nervous system in which there is interruption of the short collateral fibres constituting the spinal reflex arc, and of those forming the cerebellar arcs (anterior horn collaterals, and fibres arborizing around the cells of Clarke's column). Its occurrence in tabes dorsalis is well known, and is accountable for the abnormal postures into which

PLATE XXXIII.

HYPOTONIA IN DEMENTIA PARALYTICA



Postures assumed owing to hypotonia in dementia paralytica.

tabetic limbs can often be placed. Not only are the muscles hypotonic in this disease, but relaxation of articular ligaments can also be demonstrated, permitting of a wider range of absolute movement than is possible in the normal subject. The combination of tabes dorsalis and dementia paralytica is not a very rare occurrence in asylum practice, and in the post-mortem room tabetiform lesions of the spinal cord can be found in about 50 per cent of patients dying from general paralysis. Nevertheless, the fully developed symptomatology of locomotor ataxia is by no means common in general pareties, and, in the writer's experience, a marked degree of hypotonia is seldom seen. In this case, the absence of Rombergism, ataxia, and sphincter trouble, and the preservation of the tendon reflexes left but few data for establishing the presence of tabes dorsalis, although it must be noted that both cutaneous and deep analgesia—two of the most important diagnostic signs—were found over a large area of the body. On the other hand, the patient's mental state and general appearance were quite characteristic of dementia paralytica. The occurrence of a marked degree of hypotonia along with normal postural sense and co-ordination would appear to indicate that the syphilitic virus exercised its effects in a most remarkably selective manner on the afferent system of spinal neurones, and it further shows that a profound hypotonia may be quite compatible with complete integrity of reflex and co-ordinated voluntary action.

REFERENCES.—[1]*Neurol. Bull.* 1921, June, 207 ; [2]*Brit. Med. Jour.* 1921, i, 217 ; [3]*Jour. Neurol. and Psychopathol.* 1920, May, 45.

STOMACH, ACUTE DILATATION OF.

Robert Hutchison, M.D., F.R.C.P.

The following summary of an article by Holcomb[1] gives a succinct account of our present knowledge of this rare condition :—

By 'acute dilatation' of the stomach is meant a distinct entity of uncertain etiology characterized clinically by sudden onset, rapid distention of the abdomen, the vomiting of large quantities of dark watery fluid, and symptoms of collapse. Brinton (1858) and Rokitansky (1883) were the first to call attention to this condition. In 1883 Fagge described the disease more accurately. Because of our limited knowledge regarding the pathogenesis of acute dilatation, many theories have been advanced as to its probable course, but for purposes of discussion these may be divided into :—

1. *Functional causes* :—
    - *a.* Paralysis of the stomach, first suggested by Brinton and later supported by Steida, von Herb, Braun and Seidel. Braun and Seidel conclude that this condition is due to alterations in the gastric innervation, central, peripheral, or reflex.
    - *b.* Anæsthesia during the course of an operation.
2. *Organic or mechanical causes* :—
    - *a.* Compression of the horizontal portion of the duodenum by the root of the mesentery and mesenteric vessels.
    - *b.* Torsion or volvulus of the stomach.

In the main it may be said that there are two groups of cases—post-operative cases and those not due to operation. In 1918 Coolin, of Dublin, collected 188 cases, of which 69 per cent occurred after operation, while 31 per cent were due to non-operative conditions such as over-eating, injury to the abdominal wall, acute or chronic disease, and—in rare instances—child-birth.

The disease occurs at all ages, but especially between the twentieth and fortieth years. It is more frequent in the female sex. In approximately 75 per cent of the cases it follows operation. The onset may occur on the operating table or while the patient is still under the anæsthetic, but in the majority of cases there is a lapse of from one to several days before the symptoms set in. The first signs to attract attention are the vomiting of green or dark-brown fluid, and abdominal distention. Later, symptoms of respiratory and circulatory distress are noted; the temperature drops; cyanosis or lividity appears; the tongue becomes dry and beefy; there is unquenchable thirst; and the urine is scanty, at times even being entirely suppressed.

Post-mortem examination reveals an enormously dilated stomach which occupies the greater portion of the peritoneal cavity. The gastric walls are thinned, and show numerous hæmorrhages and erosions.

Recovery depends upon the recognition and treatment of the case. The best treatment consists in the prompt use of the **Stomach Tube.** All food and water by mouth should be stopped, and proctoclysis with rectal feeding instituted. When proctoclysis is without benefit, hypodermoclysis should be resorted to. **Lavage** with lukewarm water may be repeated every two or three hours or as soon as the patient shows symptoms of distress due to the distention. The other important factor in the treatment is the prone position first described by Schnitzler. The patient is turned with the abdomen down, and a pillow or two are placed under the hips for support. Of 26 cases thus treated, 22 recovered. Drugs are of little value in this complication.

The conclusions drawn are as follows:—

1. Acute dilatation of the stomach, while not common, is by no means rare.
2. Although the symptoms are much alike in all cases, the pathogenesis varies.
3. Acute dilatation of the stomach must be differentiated from volvulus of the stomach.
4. The condition is often mistaken for shock, ileus, obstruction, etc.
5. Mild cases may be followed by spontaneous recovery. In most instances, however, the condition proves fatal if untreated.
6. Early and repeated gastric lavage will save life in the majority of cases.
7. The posture treatment may be of great value.
8. Surgery is not indicated unless there are definite signs of obstruction.

REFERENCE.—[1]Abstr. in *Surg. Gynecol. and Obst.* 1921, March, 191.

STOMACH, FOREIGN BODIES IN. (*See* ENDOSCOPY, PERORAL.)

STOMACH, HOUR-GLASS.

Robert Hutchison, M.D., F.R.C.P.

In an address on the hour-glass stomach, Thurstan Holland[1] deals with the subject from a purely *x*-ray point of view, but some of his conclusions are of interest to the practitioner. He finds that the condition is comparatively common, though the vast majority of cases are in women. The history is almost always a long one and tells of repeated attacks of indigestion characterized by pain and vomiting. Hæmatemesis occurred in less than half the cases. The diagnosis of an hour-glass stomach cannot be made on clinical grounds alone; an *x*-ray examination is essential to establish it. As regards its relation to malignant disease, Holland's observations are of interest. He is of opinion that *x*-ray experience is strongly opposed to the theory that it is usual for cancer of the stomach to be preceded by a simple ulcer. Out of 120 females and 8 males in whom an hour-glass contraction existed and in whom the history extended over years, only one female and two males were proved to have cancer; yet, as he points out, those are just the very chronic ulcers in which malignant disease might be expected to develop.

On the other hand, an *x*-ray experience of the malignant stomach is that it is far more frequently seen in males; that on going into the history carefully, the very large majority state that the symptoms have been present for a matter of a few months only; and that never in their lives have they had any 'indigestion' before this attack. There is nothing in the history to suggest in any way a pre-existing ulcer.

There *is* a type of hour-glass contraction which is due to malignant disease, but it chiefly occurs in males; the patient gives a short history, and the x-ray appearances generally differ considerably from those seen in the simple type, and are suggestive of the condition.

REFERENCE.—[1] *Brit. Med. Jour.* 1921, i, 6.

STOMACH, SURGERY OF THE.

James Sherren, F.R.C.S.

Congenital Hypertrophic Pyloric Stenosis.—The appreciation of the value of Rammstedt's as the operation of choice in cases of this disease is noteworthy. It may, at the present time, be considered the standard operation, combining, as it does, rapidity of procedure with restoration of normal function. Ramsay,[1] in a paper based on a personal experience of ten cases treated in this way, gives a full account of the disease, and details the steps of operation and after-management, pointing out the complications that may arise. In discussing Tyrrell Gray's and Pirie's[2] theory of its causation, he records finding both adrenals and pancreas normal in size, appearance, and histology on post-mortem investigations, and also that in the male patients the prepuce was loose or had been removed. Although the death-rate was 50 per cent, this, as he points out, " is a reduction on the usual older figures, and it is hoped that the frequency of success will increase as the cause and means of prevention of serious complications becomes better known ". He was able to obtain specimens from patients dying twenty-six hours to four and a half weeks after operation, illustrating the patency of the pyloric canal and the method of repair. In concluding, he expresses the view, with which the reviewer is in whole-hearted agreement, that Rammstedt's is the operation of choice.

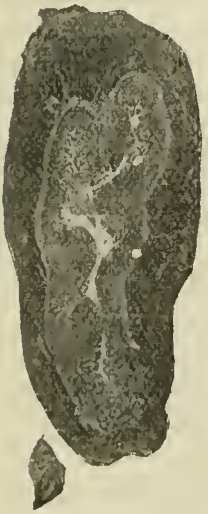


Fig. 76.—Transverse section of normal pylorus near the duodenum × 4 diam. Child of 9 weeks.

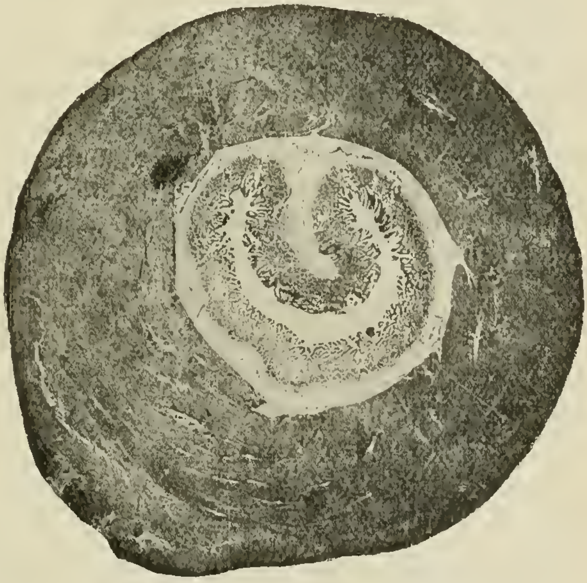


Fig. 77. Transverse section of hypertrophied pylorus near the duodenum × 4 diam. Child of 9 weeks.

This is also the opinion of John Thomson,[3] who states that " Rammstedt's operation is preferable in every respect to any other form of surgical procedure". In this important communication he gives his personal experience of one hundred consecutive cases which have been under his care in twenty-five years. In discussing its causation he considers the muscular hypertrophy due to the fact that the functional abnormality is "to be regarded as the primary element in the process—the muscle being hypertrophied merely because, from an early period of its development, it has been worried into overgrowth by constantly recurring over-action, such as would result from even a slight degree of habitual inco-ordination". He gives a very excellent illustration (*Figs.* 76, 77) of the difference between a transverse section of the pylorus in a normal child of nine weeks and that from a child who suffered from this disease.

The total mortality of all the cases was 58 per cent. He points out, what Robert Hutchison[1] had previously noted, that the mortality in hospital cases is much greater than in those treated privately. This is, I believe, due chiefly to the delay in bringing them for treatment; but he points out other reasons as follows: "There are at least three obvious reasons for this great difference. The first of these is the state of debility in which many of the hospital cases were on admission, owing to previous injudicious feeding. This has set up gastric catarrh and dilatation, sometimes with diarrhœa, and has lowered the child's resistance. In former years, the nature of the case had rarely been recognized before the patient was brought to the hospital. The second is the danger of infective diarrhœa, which sometimes occurs in hospital and practically never in private practice. The third reason is that it is seldom possible to give anything like the same amount of medical and nursing attention to the hospital cases as in private practice."

Operation was performed in 39 cases—59 per cent died. The operations and results were as follows:—

Operation	Cases	Result
Pylorectomy	1	Died
Pyloroplasty	1	Died
Gastro-enterostomy	12	3 recovered (25 per cent)
Divulsion of pylorus (Loreta's operation) ..	18	7 recovered (38·9 per cent)
Loreta's operation followed by gastro-enterostomy	2	2 recovered
Rammstedt's operation	5	4 recovered (80 per cent)

Total of cases operated .. 39 Deaths .. 23

Of the 58 cases that died, in 45 the diagnosis was confirmed post mortem, and in 4 of the remaining 13 at operation.

Reports were obtained of the present condition of 33 patients, varying in age from ten months to sixteen and three-quarter years. "The majority, doubtless owing to the extra care which their mothers have taken of them, are above the average in development and vigour; none shows any sign of serious gastric derangement. Apparently the danger to life and even to health in this disease is only temporary, and children who survive it in infancy are in no way handicapped thereby in after life. Those who were operated on are now apparently as well as the others who were medically treated."

There seems to be no doubt that mild cases of this disease may recover perfectly under skilled medical treatment, but this should not be continued if improvement does not rapidly ensue. The reviewer is of the opinion that all cases in which the typical signs are present—forcible vomiting, visible peristalsis, and the presence of a tumour—should be submitted to operation.

Acute Dilatation of the Stomach.—This condition is of great importance surgically, as at least 70 per cent of the cases occur after operation. Prompt recognition, followed by correct treatment, will save 95 per cent. Evidence continues to accumulate as to the extreme value of the prone position in its treatment. Holcomb[5] reviews the subject adequately, and recognizes the value of posture ; but this is not, in the reviewer's opinion, given the necessary first place. Treatment should be on the following lines : (1) The prone position with the hips raised ; (2) Passage of stomach tube as often as requisite to keep the stomach empty ; (3) Replacement of fluid lost by rectal salines.

Carcinoma of the Stomach.—During the year attention has again been drawn by the reviewer[6] to the possibility of preventing the onset of this disease by the early and efficient treatment of all cases of chronic gastric ulcer. Pauchet and Delort,[7] in a paper on the surgical treatment of cancer of the stomach, after expressing the opinion that three-quarters of the cases are grafted on old ulcers, advise that " all chronic ulcers must be operated on. I would say even that all active ulcers, in people of forty or over, should be operated on immediately without loss of any time through medical treatment."

Deaver and Reimann,[8] in examining 100 specimens of carcinoma removed surgically, found that 38 per cent had arisen from simple chronic ulcers.

All surgeons are aware of the 'too late' condition at which most of the cases in which there is no previous gastric history present themselves. In addition to looking with suspicion on every case of 'dyspepsia' occurring in a healthy adult, it is our duty constantly to preach the prevention of this disease by the surgical treatment of chronic gastric ulcer.

GASTRIC AND DUODENAL ULCER.

It should be the aim of all surgeons to treat lesions of the stomach and duodenum by the procedure that interferes least with function while at the same time preventing recurrence of ulceration. It is this that has led to the advocacy of so many different operations. The problem of surgical treatment differs in the case of gastric and duodenal ulcers. In the former we must recognize the fact that the condition is a pre-cancerous one, and that it is quite impossible, even at operation, to say of an indurated ulcer that it is simple. In the case of chronic duodenal ulcer there is no danger of malignancy, and the problem before us consists in the prevention of secondary ulceration. In the treatment of both these conditions we must remember that we are dealing with the end-result of some infection, and that every endeavour should be made to discover the cause.

Communications criticizing the methods at present generally employed merit careful consideration, but should not be allowed to displace them until time has proved their value to be at least equal. Such a communication is that of Davis,[9] who, in a paper on the comparative results of pyloroplasty and gastrojejunostomy in stomach surgery, criticizes the latter very unfavourably. Like most articles of its nature, it is difficult to comment upon, as it is written about an *operation* only, and the types and the seat of ulcer, gastric or duodenal, are not mentioned.

The phase, important in the evolution of gastric surgery, that all simple lesions could be treated equally well by gastrojejunostomy, has passed so far as all those prominent in this branch of surgery are concerned. The evil results mentioned by Davis after that procedure are uncommon in this country. Speaking of vomiting he states: "Obstruction, because of a kink of the efferent loop of the jejunum, was found by Cannon and Blake to be the most frequent cause of failure after gastro-enterostomy. Vomiting from this cause is frequent, no matter who the operator nor how carefully he may seek to avoid this condition." This is a most unusual complication. The reviewer's experience coincides with that of other British surgeons. In reviewing after-results among 769 patients personally treated by gastrojejunostomy for simple ulcer, to the end of 1919, re-operation was necessary in 7 only for this reason. It has been rare, even in cases of chronic ulcer of the stomach, where occasional vomiting may occur. Diarrhœa is said to be a frequent result; again this is contrary to our experience, and apart from the rare instances of jejunocolic fistula is almost unknown. He pleads for a wider use of pyloroplasty in the treatment of both gastric and duodenal ulcers.

No standardized operation can be performed for all cases of ulcer, but, so far as chronic duodenal ulcer is concerned, at the present time gastrojejunostomy gives such excellent results that it should not be lightly displaced on theoretical grounds until cases treated by other methods, traced over a number of years, have proved to be as satisfactory.

In this paper, what is in the reviewer's opinion one of the most important points—the original infection—is only dealt with in a few lines at the end of the article. He suggests that "many of the so-called successes will be disappointing, especially if the follow-up system is carried out over a series of years." The 'follow-up' system has been in practice for many years with the surgeons in this country who have dealt with large numbers of these cases, and it is on these results that present practice is based.

While all look forward to the time when mutilating operations on the stomach are unnecessary, we must not neglect old procedures that have proved beneficial for others, theoretically more physiological, the benefits of which have not been proved.

It should first be remembered that the fact that the patient has an ulcer does not in itself indicate surgical treatment unless some complication threatening life has arisen. In recent lectures on the subject, the reviewer[10] states: "Every case should be submitted to prolonged medical treatment in bed, after attending to all septic foci in the mouth or elsewhere, before resorting to the surgeon. Such thorough treatment in the early stage would cure many of the cases. The failure of medical treatment or a relapse is an indication for operation."

Deaver and Reimann[11] emphasize the same, but state: "It must be realized then when once the ulcer has become chronic, medical treatment is not likely to effect a cure."

That the operation of gastrojejunostomy brings about the healing of all 'free' duodenal ulcers and all 'free' chronic gastric ones in which the opening can be placed to the cardiac side, the writer believes to be proved. Further evidence is forthcoming.

Métraux[12] studied the post-operative course of 210 cases of gastric and duodenal ulcer treated by gastrojejunostomy in Roux's clinic. "The patients considered cured are those who for several months or years had been able to do their full work and to eat any kind of food without experiencing symptoms which could be referred to the trouble for which the operation was performed." Cure resulted in 90 per cent of 'pyloric' ulcers, 86·6 per cent in those more distant from it. He believes that the results demonstrate the superiority of gastrojejunostomy to all operations for ulcer. In five of the cases in all probability carcinoma supervened. For this reason, and because ulcers which have perforated and involved neighbouring organs, e.g., pancreas and liver, rarely heal by this operation alone, the majority of surgeons the world over advocate direct treatment of the ulcer.

Perforation.—Deaver and Pfeiffer[13] have made an important contribution to this subject. They are firm advocates of primary gastrojejunostomy in the treatment of perforation of gastric and duodenal ulcers, and apparently carry it out in cases in which the ulcer which perforates is acute, as well as in those in which the ulcer giving way is a chronic one. Unfortunately details of the type of ulcer are not given.

The reviewer has long been an advocate of primary gastrojejunostomy when the ulcer which perforates is chronic, and the condition of the patient permits. But in acute ulcer he believes that this is unnecessary—search should be made for the source of infection, and this dealt with. In 1912[14] he wrote as follows of perforated gastric ulcer and of duodenal ulcer: "Gastrojejunostomy should be performed at the same time in all cases in which closure of the perforation produces pyloric contraction, or when the ulcer that has perforated is a chronic one. The performance of this operation at the time of closure of the perforation will lead to a more rapid convalescence and the prevention of after-trouble." This had then been the treatment for several years, and time has only confirmed the opinion then expressed. In a recent short article he[15] emphasizes the need for this for the cure of the ulcer or, if impossible owing to the patient's condition, at a second operation two or three months later. He records a patient who, after perforation of a chronic duodenal ulcer, refused gastrojejunostomy, to die of a second perforation in six months.

Deaver's[16] paper further illustrates the excellent result that can be obtained if the condition is recognized early. Sixty-seven acute perforated ulcers were operated upon, with a mortality of 7·5 per cent.

Lewisohn[17] adds four cases to those previously reported of the failure of simple closure of perforation to cure the ulcer, and advocates, wherever possible, gastrojejunostomy in perforated pyloric and duodenal ulcers.

Chronic Gastric Ulcer.—

Diagnosis.—Stress was laid in last year's Annual on the difficulty of diagnosis in these cases. Devine,[18] of Melbourne, in an interesting contribution on "The Surgical Problems of the Stomach and Duodenum", speaks of the great difficulty in diagnosis: "Out of about five hundred non-malignant stomach histories which I have carefully recorded, only about one hundred showed definite organic disease, as proved by *x*-ray pictures, operation, and the subsequent history. These were patients who came to me as a surgeon. A still larger proportion of inorganic disease will occur in the practice of a physician. It is small wonder, then, that the surgeon finds that one of his greatest problems is to distinguish from cases that may be loosely referred to him, those that he may benefit by operation. The fact that the vast bulk of apparent stomach disease is functional or reflex is not generally recognized. Extrinsic disease simulating a stomach lesion can generally be cured by the operation; its elimination is therefore not so important. An exploratory operation for any of the many forms of neuroses of the stomach, which are so easily confused with organic disease, will be a misfortune. The patient will be constantly reminded by the persistence, perhaps exacerbation, of the symptoms that a useless, perhaps harmful, operation has been performed. Still worse will be a gastro-intestinal anastomosis, even in the presence of an organic lesion, unless it is clear that there is no associated gastric neurosis, gastroptosis, or duodenal dilatation."

The reviewer wishes to emphasize these statements, which should be remembered by all who have to treat abdominal disease.

Devine[19] places first in order of importance a careful study of the clinical history, secondly *x*-ray investigation. He comments on the fact that the former is so often neglected: "It is a queer attitude of mind that in these modern days the former should be so often neglected for more fanciful and scientific methods. I have seen patients pronounced healthy because a test-meal and the skiagram were negative, whereas a careful abdominal examination would have revealed a tumour more or less obvious." With regard to vomiting and hæmatemesis he writes as follows: "Vomiting and hæmatemesis may be features in the syndrome of chronic gastric ulcer, but when the main symptom is vomiting or hæmatemesis, the ulcer which it is the custom to diagnose is never found, but rather a neurosis, a cirrhosis, a gastroptosis, etc, Acute ulcer—the province of the physician and not the surgeon—gives hæmatemesis and vomiting without pain, hence the confusion. But the majority of cases diagnosed as acute ulcer are really due to the diseases just indicated."

Both Sir Berkeley Moynihan[20] and the reviewer laid much stress upon this. The former writes of vomiting: "When in the record of any patient suffering from 'dyspepsia' there is a story of frequent vomiting, of the inability of the stomach to tolerate the presence of any foods, of even fluid nourishment sparsely taken being at once rejected, the thought that gastric ulcer is the cause should be driven from one's mind." Of hæmorrhage: "That gastric hæmorrhage occurs, and occurs profusely, in ulceration both of the stomach and duodenum is certain; but the number of other conditions that give rise to hæmorrhage is so large that the possibility of a gastric ulcer being the source of the blood should not be strongly, or exclusively, held." Of hæmatemesis the reviewer[21] writes: "It is most often met with in patients who show no evidence of the existence of a definite ulcer." Of vomiting[22]: "Vomiting, though rarely absent in the course of the disease, is not a frequent symptom. The patient who says she vomits everything directly she takes it has not a gastric ulcer, and probably will not be benefited by operation."

Treatment.—In discussing the treatment of this condition it is necessary to take into consideration three facts which have been brought out as the result of clinical investigations: (1) A chronic gastric ulcer is potentially malignant; (2) Direct treatment alone (excision) fails to cure a large percentage; (3) Indirect treatment—gastrojejunostomy—is curative in suitable cases.

1. On this point there is unanimity among surgeons. Deaver and Reimann[23] in their paper state: "Depending on the view-point and the criteria chosen, the incidence of carcinoma arising from ulcers varies in published reports from five or six to seventy per cent. It can safely be said that carcinomata do arise from gastric ulcers, and whether the percentage be high or low, the fact is a most important one for clinical use." They report on the examination of the last hundred specimens of gastric carcinoma removed surgically that 38 per cent arose from old simple chronic ulcers.

2. It is an established fact that local excision is followed by a high percentage of recurrence. It is necessary to emphasize this from time to time, as it is an operation which is still being done in spite of the published results. The largest series of cases are those recorded by Balfour[24] from the Mayo Clinic in 1917. Eighty-four cases were treated by excision alone; 27 of these (32 per cent) required subsequent operation. In 8 operated on by the reviewer, relapse occurred in 6, and operation for fresh ulceration was necessary in 5.

The more extensive operation of circular or sleeve resection, in which a segment of the stomach is removed, carried with it a high recurrence-rate. For a time it enjoyed great repute, particularly on the continent, but not only were cases of recurrence recorded, but contraction of the scar producing hourglass stomach. Moynihan,[25] speaking of this method, says that he has not performed it for years, as the end-results were unsatisfactory. Deaver[26] apparently found the results unsatisfactory, as he states that he performs gastro-enterostomy to the pyloric side of the line of suture, adding: "Formerly I did not always make the anastomosis, but since I have adopted the procedure I have applied it many times with most satisfactory results." Haberer[27] and Eiselsberg[28] have both given up the proceeding on account of the frequent recurrence of ulceration.

3. This point was fully discussed by the reviewer in last year's ANNUAL (pp. 429, 441).

In the early days of pylorectomy and partial gastrectomy, direct union of the cut ends of the stomach and duodenum was carried out by the method devised by Billroth (Billroth I). As this was found difficult in many cases, both cut ends were closed, posterior gastrojejunostomy being carried out to the portion of stomach left (Billroth II). This, again, was modified by uniting the jejunum side-to-side with the cut end of the stomach. This modification of Billroth II seems to have been devised by several. The reviewer, who performed the operation in 1911, thought at the time he was the first, but found later that Polya[29] had published an account of six cases in which he had carried it out. This, or some modification of it, has now become the operation of choice with most surgeons. Recently, however, Haberer,[30] in two communications advocated reverting to the method of direct union (Billroth I), and lays great stress on the necessity for removal of the pylorus in the prevention of jejunal ulcer and recurrence of ulceration. He advocates this for the treatment of both gastric and duodenal ulcer, and has carried it out in 220 cases with a mortality of a little over 3 per cent. Eiselsberg[31] has also recently been employing the same method. The immediate results have been good, but, with one exception, the operations had all been carried out within the last year. Enderlen[32] records two recurrences after Billroth I, the ulcers not being situated at the scar It must be some years before it can be said that the prospect of cure equals that of the older method.

From time to time experimental work on the production of gastric ulcer by injury to the vagus or abdominal sympathetic has been carried out, but with varying results. Surgeons, in seeking surgical treatment for the cure of ulcer less mutilating than excision or altering conditions less than gastrojejunostomy, have turned to the possibility of nerve resection for this purpose. Steinthal[33] records two cases treated by the operation devised by Stierlin—division of the fibres of the vagus and sympathetic, with a view to preventing hypersecretion, lowering gastric acidity, and abolishing pyloric spasm. In both cases no change in secretion or motility was obtained; the hypersecretion and hyperacidity in both remained as before operation.

Bircher[34] has devised and practised a somewhat similar operation for cases in which ulcer was not found at operation, and he applied it later to gastric neuroses. He reports: "The operation is followed by the cessation of the pain, nausea, and vomiting, improvement in the secretory condition, and the return of the normal gastric tone, shape, and position. This seems to be disproved by the two cases reported by Steinthal and the experimental work of Borchers,[35] who, as the result of numerous experiments on cats and rabbits, came to the conclusion that the vagus is not the motor nerve of the stomach, and shows that operations on this nerve are useless to prevent pyloric spasm. It is the experience of all surgeons who have operated on cases of 'gastric neurosis' that the exploration had sometimes led to complete relief for a time which is occasionally considerable.

Pierre Duval,[36] after describing methods applicable to different types of chronic gastric ulcer, states : "Surgical intervention must always be directed towards the destruction of ulcers, with the addition of gastro-enterostomy when gastric stasis is present."

Deaver[37] advocates destruction of the ulcer with the knife or cautery, combined with gastrojejunostomy, in the majority of cases, or some type of partial gastrectomy.

Devine,[38] as the result of his experience, advocates direct treatment of the ulcer, and in the majority of cases does not consider gastrojejunostomy necessary. His experience is thus opposed to that of the majority of surgeons specially interested in this branch of surgery.

No one operation can be advocated for every type of case. Our aim is to produce healing and prevent recurrence. At the present time, the reviewer's methods are gastrojejunostomy, combined perhaps with destruction of the ulcer with the cautery after Balfour's method for small free ulcers on the lesser curvature ; partial gastrectomy for the chronic perforated ones and all with any suspicion of malignancy.

The *after-treatment* must not be lost sight of ; this is emphasized by Deaver.[39] The changed physiology should be remembered, and in cases with high gastric acidity after-treatment should be regulated by the post-operative test meal.

Hæmorrhage.—Hæmatemesis, in the majority of cases, is not an indication for operative treatment, no definite ulcer being present. When, however, the bleeding can be diagnosed, or is even suspected, as coming from a chronic ulcer, operation should be carried out without delay. This the reviewer has taught for many years. In Choyce's *System of Surgery* published in 1912 he wrote as follows :[40] "In this group, unlike the first, operation must be carried out in all cases. It must be undertaken as soon after the cessation of the first bleeding as the patient's condition will permit ; this will usually be in thirty-six to forty-eight hours. During this time absolute rest and the avoidance of oral feeding are essential. If, in spite of this treatment, the bleeding continues or recurs, operation should be resorted to without delay. During the period of waiting after the first attack, a careful watch must be kept to see that bleeding is not continuing although no blood is being vomited."

Finsterer,[41] in recording 32 cases of gastric ulcer operated on for acute hæmorrhage, states that for the last four years he has favoured immediate operation. His statistics show a mortality of 11·7 per cent.

Duodenal Ulcer.—

Symptoms and Diagnosis.—The symptoms of chronic duodenal ulcer as enunciated by Sir Berkeley Moynihan in 1905 have been generally accepted in the English-speaking world as diagnostic of the condition, and it is but rarely that discordant views are published. The reviewer is, if possible, more fully in agreement with these statements each year that passes. If the characteristic symptoms are present he agrees that "upon them alone a confident diagnosis of duodenal ulcer may be made". But the symptoms must be typical, and the reviewer lays stress on the examination of the gastric contents : he has found an excess of free HCl and a high total acidity in at least 90 per cent. He writes :[42] "The symptoms of duodenal ulcer, in the majority of cases, are so definite that the diagnosis can be made on the history alone with more accuracy than in any other abdominal disease which may come under the care of the surgeon. The typical symptoms consist of attacks, usually of two to three weeks' duration, separated by intervals of perfect health for months—often many months. The attacks are more common in cold weather ; may be precipitated by exposure to cold, worry, overwork, or some indigestible article of food. Pain comes on late after food—two or three hours—lasts to the next meal and is relieved by it. It is regular—day after day—and frequently wakes the patient between 2 and 3 a.m. The pain is so regular that the patient frequently can tell the time by it. With the pain is associated hyperacidity, the average in males is free HCl 0·16 and total acidity 70; in females 0·1 and 50. Vomiting is very unusual. When symptoms such as I have described above are present, the diagnosis is absolute. No other disease mimics a picture such as this. Symptoms such as these are present in about 75 per cent of the cases."

In Rovsing's[43] exhaustive paper on the pathology, diagnosis, and treatment of chronic duodenal ulcer, based on 164 cases, 152 of which were operated upon, this view of the symptoms of duodenal ulcer is disputed. He states that many patients diagnosed as duodenal ulcer on this symptom-complex were found to be suffering from gastric ulcer, gastroptosis, or gastritis, and says that it cannot be considered characteristic. It is difficult to dispute such a statement, but it is equally difficult to believe that all the symptoms which have been noted were present, and conditions other than duodenal ulcer found. He also criticizes the conclusions of Moynihan and the Mayo Clinic as to the frequency with which this ulcer is found in comparison with gastric ulcer, and considers the discrepancy due to the fact that exploration of the stomach, digitally or by gastroscope, has enabled him to make the diagnosis with greater accuracy. The reviewer agrees with Moynihan[44] that the situation of the ulcer can be determined, with an error of less than 10 per cent, by its relation to the pyloric vein. Moreover, there seems little doubt that the relative number of cases of gastric and duodenal ulcers which come under the care of the surgeon varies, not only in different countries but in different parts of Great Britain. This seems evident from the figures given below. Rovsing treated between the years—

1898–1908 ..	28 duodenal ulcers ..	97 gastric ulcers.
1908–1917 ..	130 ,, ,, ..	125 ,, ,,
	158	222

Sherren operated upon—to December 1, 1920 (including cases of acute perforation)—

537 duodenal ulcers 416 gastric ulcers.

Moynihan[45]—from the year 1909 (excluding acute perforation)—

563 duodenal ulcers 235 gastric ulcers.

Mayo Clinic[46]—from January 1, 1906, to January 1, 1920—

4532 duodenal ulcers 1191 gastric ulcers.

Treatment.—Gastrojejunostomy is a curative operation for chronic duodenal ulcer in at least 90 per cent, and the actual failures are, at the present time, less than 2 per cent. For the cure of the ulcer it is not necessary, or advisable, to invert it or excise it; should destruction of the ulcer be necessary on account of bleeding, or a perforation have to be closed, it should be so carried out that the pylorus is not narrowed. That the ulcer heals and remains healed there is no doubt. The reviewer has had the opportunity of examining post mortem 9 cases up to nine years after operation, and at second operation 23 up to ten years later—the ulcer had healed in all except one, who died on the sixth day.

The complication to be feared is the occurrence of secondary ulceration, the incidence of which can be greatly diminished, if it cannot be completely abolished (*see* Medical Annual, 1921, p. 438).

Further communications have appeared during the year with regard to those procedures—excision, pyloroplasty, and partial gastrectomy—noticed in last year's ANNUAL.

Rovsing[17] states that gastrojejunostomy is a palliative operation only. This conclusion is arrived at from a study of his operative results, a table of which is given. Sixty-one cases were treated by gastrojejunostomy with entero-anastomosis, and 12 with gastrojejunostomy combined with pyloric exclusion. It is no matter for wonder that in the former group there were 10 recurrences and 2 peptic ulcers. The good result of gastrojejunostomy is not only due to its mechanical action but to the reduction it brings about in gastric acidity ; this does not take place to so great an extent and often fails to occur when entero-anastomosis is carried out. Of the 12 with pyloric exclusion, 6 died ; of the remaining there is no report, but it is undoubted that this operation is very frequently followed by secondary ulcers. He has treated 43 cases by excision and pyloroplasty, with 1 death and no recurrence. In conclusion he states that he considers excision of the ulcer, with pyloroplasty, the operation of the future.

Shelton Horsley,[18] in a paper on jejunal ulcer, records 24 pyloroplasties, treated by the method reviewed in last year's ANNUAL. As mentioned previously, there is nothing to indicate the nature of the ulcer, whether gastric or duodenal. In the reviewer's opinion each presents different problems and they cannot profitably be discussed together.

As mentioned under gastric ulcer, Haberer and Eiselsberg, on account of the frequency of jejunal ulcers, are doing partial gastrectomy, restoring continuity by the Billroth I method.

Devine's[19] experience in the treatment of duodenal ulcers differs from that of most surgeons in this country and America. He considers that gastrojejunostomy will only cure a proportion of these cases. He performs an operation that he has devised ; the reviewer believes it is based on erroneous evidence. He states : "All evidence goes to show that gastro-enterostomy ensures the healing of the ulcer, and in time the tendency is for the chyme to resume its normal course. *The stoma contracts from lack of function.* We have then the same set of circumstances as before the ulcer was formed, except that the ulcer-bearing area now has a scar—a locus minoris resistentiæ." If no marginal ulceration occurs the stoma shows no tendency to close, it remains patent, acting should spasm again supervene, and permanently abolishing excessive gastric acidity.

In the operation devised, the stomach is cut across 2·5 cm. from the pylorus, and implanted, end to side, into the jejunum, about 7·5 cm. from the duodeno-jejunal juncture (*see Plate XXXIV*).

It has been proved that chronic duodenal ulcers heal after gastrojejunostomy, and that the danger lies in secondary ulceration. The reviewer cannot see how the new operation will render this less frequent. Eleven patients had been operated on by this method ; the earliest three years previously. All were well at the time of report.

He draws attention to the rare cases of chronic duodenal obstruction from pressure of the superior mesenteric vessels, a condition for which he has performed jejunoduodenostomy in three cases. This is a treatment that was first carried out by Stavely[50] in 1908 ; and the reviewer has performed it in several cases with gratifying results since 1911.

Gastrojejunal Ulceration.—This subject was fully reviewed in last year's ANNUAL. Further evidence has been brought forward to prove the connection between pyloric exclusion, however practised, and the formation of secondary ulcers.

The reviewer,[51] in a lecture on duodenal ulcer, said : "At the time that I was working on my Hunterian Lecture. I was not able to account entirely to

PLATE XXXIV.

OPERATION FOR THE REMOVAL OF A DUODENAL ULCER.

(Devine)

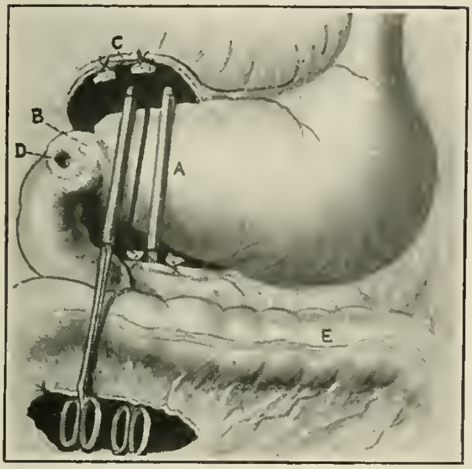


Fig. A.—Showing the site (A) for the section of stomach

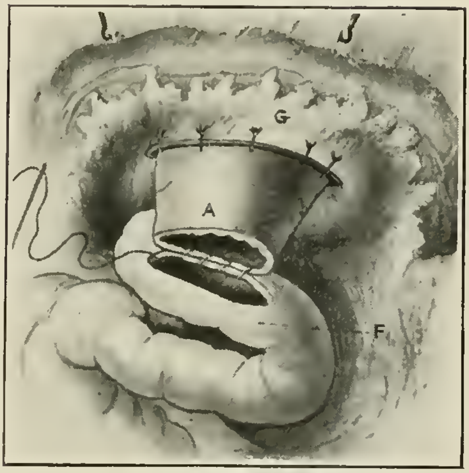


Fig. B.—Implantation of A into upper part of jejunum.

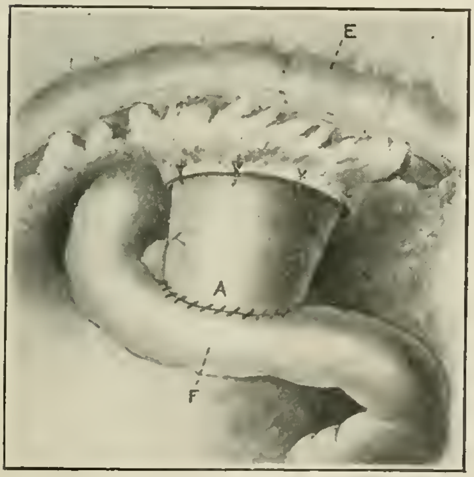


Fig. C.—Position of intestine in relation to stomach.

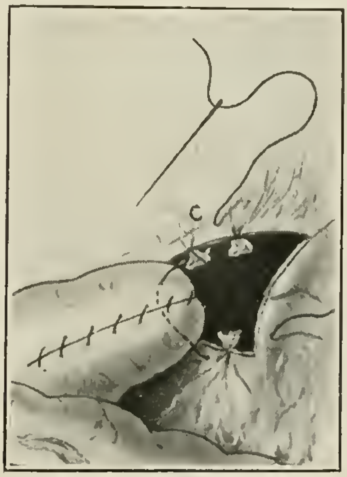


Fig. D.—Closure of space C (*see Fig. A*) by suture of the omentum over duodenal suture line.

A, Site of section of stomach ; B, Pylorus ; D, Ulcer ; E, Colon ; F, Jejunum ; G, Mesocolon.

Redrawn from the 'Medical Journal of Australia.

my satisfaction for the fact that jejunal ulcer had not occurred after operation in my earlier cases, but mostly in those done in 1911–13. The cause, I believe, lay in front of me, but I failed to see it until a patient, upon whom I operated this year, returned with symptoms of jejunal ulcer. On going through his notes, I found that I had had to occlude his duodenum on account of a perforation I discovered on separating an adhesion to his gall-bladder. I looked up all my notes of previous cases, and found that in 1911–13 I was carrying out pyloric exclusion, but then omitted it as I considered it had been the cause of one or two cases of post-operative hæmorrhage."

Recently a further case has occurred, and on looking up the post-operative test-meals of those patients in whom the pylorus was occluded, I found that in no case did marked post-operative diminution in acidity occur. Haberer[52] has published most instructive figures in this respect. After 710 resections of stomach, varying from pylorectomy to partial gastrectomy, no case of jejunal ulcer developed. After 265 cases of gastrojejunostomy, 3 came under observation, while in 71 in which the pylorus was excluded there were no less than 14.

That the Billroth II type of partial gastrectomy is no safeguard is evident from the fact that the development of jejunal ulcers after this procedure have been recorded by Eiselsberg[53] and also by Baum.[54]

Erdmann,[55] in recording twelve cases of secondary ulcer which he has operated on, discusses their etiology, and mentions the use of non-absorbable material, and pressure from clamps, and suggests "the question of syphilis as a probable strong factor". He comments upon the reproduction of ulcers, and says: "I am inclined to believe that a personal idiosyncrasy exists." In prophylaxis he mentions non-use of clamps, suturing of mucosa of stomach and duodenum in a separate layer with the use of absorbable material throughout, and careful attention to diet after operation.

C. H. Mayo[56] states that, to Jan. 1, 1920, 83 patients with gastrojejunal ulcers were operated on in the clinic, in 47 of which the primary operation was done there.

Eustermann,[57] in an article on these cases, states that in one-third retained suture was the probable cause, and that in 88 per cent symptoms appeared within twelve months of the original operation.

REFERENCES.—[1] *Brit. Jour. Surg.* 1921, April. 408; [2] *Med. Annual*, 1921, 435; [3] *Edin. Med. Jour.* 1921, Jan., 10; [4] *Brit. Med. Jour.* 1910, ii, 1021; [5] *Minnesota Med.* 1920, iii, 486: [6] *Lectures on Surgery of Stomach and Duodenum*, 1921, 73; [7] *Presse méd.* 1920, Nov. 6, 793: [8] *Ann. of Surg.* 1921, April, 441; [9] *Ibid.* 450; [10] *Loc. cit.* 35; [11] *Surg. Gynecol. and Obst.* 1921, Feb., 103; [12] *Rev. méd. de la Suisse Rom.* 1920, xl, 569; [13] *Ann. of Surg.* 1921, April, 441; [14] Choyce's *System of Surgery*, 1912, 357, 368; [15] *Clinical Jour.* 1920, Nov. 3, 330; [16] *Loc. cit.*; [17] *Ann. of Surg.* 1920, Nov., 595; [18] *Med. Jour. of Australia*, 1921, Feb. 5. No. 6; [19] *Ibid.*; [20] *Brit. Med. Jour.* 1919, Dec. 13; [21] *Lectures on the Surgery of the Stomach and Duodenum*, 1921, 32: [22] *Ibid.* 21, 22: [23] *Surg. Gynecol. and Obst.* 1921. Feb., 103; [24] *Surg. Gynecol. and Obst.* 1917, June, 731; [25] *Med. Record*, 1921, May 28; [26] *Loc. cit.* 105; [27] *Centralb. f. Chir.* 1921, June 18, 847, and *Arch. f. klin. Chir.* 1920, cxiv, 127; [28] *Arch. f. klin. Chir.* 1920, Oct. 22, 114; *Wien. klin. Woch.* 1921, i, 108; [29] *Birmingham Med. Rev.* 1915, Nov., 127; [30] *Loc. cit.*; [31] *Loc. cit.*; [32] *Centralb. f. Chir.* 1921, May, 28, 762; [33] *Ibid.* 1920, xlviii, 1444; [34] *Surg Gynecol. and Obst.* (abstr.) 1920, Dec., 450: [35] *Centralb. f. Chir.* 1920, xlviii, 1441: [36] *Presse méd.* 1920, Oct. 13. 73: [37] *Loc. cit.* 103; [38] *Med. Jour. of Australia*, 1921, March 5; [39] *Loc. cit.*; [40] Choyce's *System of Surgery*. ii, 372; [41] *Therapeutische Halbmonatshefte*, Berlin. 1920, Oct., 34, No. 19, and *Centralb. f. Chir.* 1920, 158; [42] *Lectures on the Surgery of the Stomach and Duodenum*, 1921, 43: [43] *Arch. f. klin. Chir.* 1920, Aug. 2, 173; [44] *Med. Record*, New York, 1920, July 24, 103; [45] *Brit. Med. Jour.* 1920, July 24, 103; [46] *Ibid.*: [47] *Arch. f. klin. Chir.* 1920, Aug. 2, 173: [48] *Jour. Amer. Med. Assoc.* 1921, Feb. 5, 354: [49] *Med. Jour. of Australia*, 1921, Feb. 12, 103; [50] *Surg. Gynecol. and Obst.* 1910, 288, and *Johns Hop. Hosp. Bull*, 1908; [51] *Lectures on the Surgery of the Stomach and Duodenum*. 1921, 54, 55; [52] *Centralb. f. Chir.* 1921, May 28, 762: [53] *Wien klin. Woch.* 1921, March 10, 108; [54] *Centralb. f. Chir.* 1921, April 30, 586; [55] *Ann. of Surg.* 1921, April, 434; [56] *Ibid.* March. 328: [57] *Jour. Amer. Med. Assoc.* 1920, Dec. 4, 1595.

STOMACH, ULCER OF. (*See* Gastric and Duodenal Ulcer; Stomach, Surgery of.)

SUGGESTION. (*See* Psychological Medicine.)

SURGERY, THE ADVANCE OF.[1] *Sir W. I. de C. Wheeler, F.R.C.S.I.*

In studying the present age of rapid advance and making plans for the future, surgical progress can be helped by taking to heart certain lessons. If not from day to day, at all events from year to year, the outlook of the operating surgeon must alter. It is no use when young deciding what is best in surgery and developing to the utmost a system based on the work of contemporary leaders in the belief that it will suffice for a lifetime. Think of the manufacture of motor-cars, and compare the engines of to-day with those of ten years ago; the small improvements in carburettor, magneto, and essential parts have in a decade produced an almost perfect machine. The danger is that as we grow older and our minds less receptive, we may miss in surgery the cumulative effect of small advances.

We learn another lesson by noting the incredulity and scathing disbelief, the merciless and destructive criticism, which accompanied such epoch-making discoveries as anæsthesia and antiseptic surgery. Who knows but that we are on the verge of the solution of the cancer problem? All of us have seen the melting away into thin air of masses of cancerous growth under the action of radium; it is almost past belief that an infiltrating ulcer in the tongue and mouth beyond the possibility of successful operation can be made totally to disappear in a few days, yet such cases are often seen. Truly, it is not a cure, but it prepares the mind for vast possibilities. Although surgery is defeated by metastasis in cancer, in syphilis salvarsan and its derivatives can search every corner of the organism until the virus .is rendered inert or finally destroyed. Research is only temporarily baffled; an army of workers are abroad in the laboratories, and clinical observers are now everywhere on the alert. How interesting it is to speculate on the connection between a slight injury to bone and the development of sarcoma. We think of the great capillary supply of the cancellous ends of the bones, and how a slight injury causing a capillary hæmorrhage within may set free the tubercle bacillus or other organism with results which can be accurately pictured. It is not so long since our ignorance on this subject was complete. We know that the same slight injury, in the same place, in similar individuals, will be followed by a malignant growth, and yet a severe injury causing fracture is followed neither by the one condition nor the other. The case of the breast is perplexing, for carcinoma is very often preceded by injury; elsewhere it seems to be the product of continued irritation. Will the observation that growth in cancer is stimulated by acidity and inhibited by alkalinity lead us anywhere? That hot drinks are probably a cause of no little importance in producing cancer of the stomach requires careful thought.

Bland-Sutton wonders, if he could fathom the secret of the changes of pigmentation in the plumage of certain birds at the breeding season, how much nearer he would be to a solution of the problem of melanotic sarcoma. In an address on the surgeon of the future he is delightfully crisp in his denunciation of some of our reasoning powers and biological deductions. A lecturer on anatomy waxed eloquent on the subject of cerebrospinal fluid serving as a water bed for the brain in order to preserve it from harmful concussions. Bland-Sutton was not convinced—he told his teacher that the explanation was absurd, for the relative bulk of the brain and cerebrospinal fluid resembled an ironclad in a duck pond. He emphasizes the relationship of sepsis and cancer, and contrasts the numerous cases of fatal infection after removal of the colon for cancer with the immunity from infection which follows operation on the abdomen for non-malignant disease. Our methods for preventing infection in the former class are to his mind almost as clumsy as attempts to kill fleas with bludgeons. He alludes to the use of gloves, sterilized overalls, caps, masks, and top-boots, when a cancerous segment of the colon swarming with bacteria is to be removed, as surgical coquetry. In the same strain he describes surgeons as either craftsmen or biologists, and credits the former, *inter alia*, with inventions such as the œsophagoscope, " which requires for its successful use a surgeon with the instincts of a sword-swallower and the eye of a hawk ". I do not know how far the experimentalists have carried us along the road ; one thing only is certain, that if the riddle of cancer is solved in our time and we resemble our ancestors, which God forbid, we will scoff for a generation and allow posterity to have the benefit. To those who would keep on the straight road and move as quickly as circumstances permit, Osler gives admirable advice. Teachers must have a full personal knowledge of the branch taught, not second-hand information derived from books. Men are required to have a sense of obligation, " that feeling which impels a teacher to be a contributor and to add to the stores from which he so freely draws ". To do this it is necessary to know the best all the world over. He will burden an already overladen literature with faulty and crude observations unless he is familiar with the workers abroad. In another essay he tells us that when a man talks slightingly of the position and work of his profession in any country, or when a teacher tells you that he fails to find inspiration in the work of his foreign colleagues, in the words of the Arabian proverb, " He is a fool, shun him ". Personal first-hand intercourse with the men of different lands when the mind is young and plastic is the best antidote against ignorance. Osler tells some home truths. He discusses the weakened receptivity and the inability of men over forty to adapt themselves to an altered intellectual environment. " It is this loss of mental elasticity which makes men over forty slow to receive new truths." It is well to recognize this unpleasant fact, and to gain comfort by believing with so great a writer and physician that salvation lies " in living in and with the third decade in company with the younger, more receptive, and progressive minds." Thus it is essential to travel, to see the work of others at frequent intervals, to cultivate discriminate reading, and to contribute from time to time useful knowledge for the benefit of others.

Hole-and-corner surgery will disappear, and playing to the gallery is already dead. " Surgery of the brilliant kind ", says Moynihan, " is a desecration. Such art finds its proper scope in tricks with cards, in juggling with billiard balls, and nimble encounters with bowls of vanishing goldfish."

Some dreaming, a little hero-worship, and speculation as to what we are aiming at and living for is not unprofitable, but there are many who will desire to approach the subject of surgical progress from a more practical and utilitarian point of view. To do this a fundamental contrast must be drawn between our ancestors and ourselves. Every epoch in surgery is associated in the past with the names of individual men. All in the great procession, from Hippocrates to Lister, answer their names to the roll call, and each one marks a notable period in surgical advance.

That day is passing, and from now on progress will have in all probability little or nothing to do with individual supermen, except so far as they are the organizers and centre-forwards, so to speak, of a thoroughly efficient team. The art of surgery is now so wide that no one man can expect to be expert in all branches, and yet a knowledge of all branches should, in the interests of science, be brought to bear on almost every surgical or medical case. The logic of it is that from henceforward work will be best done in teams and groups. Craftsmen and biologists, physicians, gynæcologists, biochemists and pathologists, those skilled in the use of x rays, radium, and the cystoscope, with subdivisions such as neurologists, abdominal surgeons, and the like, must work as units in groups and teams so that they may fully understand their interdependence, one upon the other, in the search for truth. To some extent such a system pervades the atmosphere in every large general hospital; but it is by no means complete, and the close co-operation necessary to produce real results is everywhere conspicuous by its absence. The private patient is deprived, as a rule, of anything approaching scientific method.

Team work is a religion in the Mayo Clinic, Rochester, and many lessons are to be learnt from a visit there. Transfusion of blood is done extensively; there is a roster of blood-givers in the town. Pain in the back is one of the first signs of reaction, and if this occurs the transfusion is stopped. Even with proper grouping, reaction and death have occurred. The cause of this reaction is not known, but careful investigation is proceeding, and the problem is not likely to remain unsolved. A case of pernicious anæmia is transfused once a fortnight; one case had forty transfusions. They all die in the end, but the treatment is well rewarded by marked temporary improvement.

The Gasserian-ganglion operations appear to the onlooker like minor work; there is no blood, no shock, no hitch. Adson, who is probably not more than thirty years of age, is responsible for surgical neurology. The patient is anæsthetized, as is the custom, by a nurse. He is placed almost in a vertical position, his head being on a level with the head of the operator standing on the floor. A straight incision is made half an inch in front of the ear, the lower extremity being on the zygoma. The skull is then opened with Hudson's drill, and the opening enlarged with nibbling forceps. A little cerebrospinal fluid is withdrawn to render easier the lifting up of the dura. The middle meningeal artery is tied and the dura propria is incised. The afferent root is divided with a specially constructed guillotine, and the operation is over. The ganglion is not avulsed or interfered with, and no trophic disturbance follows the operation; therefore the trophic centre may be in the ganglion or peripheral to it. Anæsthesia follows in the cornea, as is to be expected, but there is never a recurrence of symptoms.

One could proceed *ad infinitum* mentioning points of interest: how the active principle of thyroid secretion was discovered almost by accident in the laboratories after examination of some tons of thyroid obtained from meat factories. This substance, administered to hypothyroid and myxœdematous patients, produces results far in advance of any other known preparation, but it is much too expensive for general use. Efforts are now being made to produce it synthetically.

Radium is used a week before operation in suitable malignant cases; the interval between application and operation is short owing to the adhesions and cicatrix found when a longer time is allowed to elapse. Very small capillary glass tubes are often used containing half a millicurie of radium emanation, and these are left permanently *in situ*.

I was in a laboratory when a demonstration was being made showing that thyroid extract produced by one firm had five times the iodine content of that produced by another. Some popular preparations were of no use because bacterial action had probably destroyed the active principles in the drying process to which the gland was subjected.

What a lesson to ponder over when we write prescriptions containing the names of drugs, perhaps potent, perhaps not, but always with hieroglyphics and symbols, and thus we carry on the old idea of mysticism associated with the medicine of mediæval times. "You humbugs of doctors", says one of Charles Reade's characters, "couldn't speak plain to save yourselves from hanging."

"After fifteen years given to the science of obscurity Mr. Sawyer literally could not speak plain in one moment." It is suggested to the reader that the science of Æsculapius is guess-work, but the patient "goes on hoping and hoping something from traditional remedies, even when they fail and fail and fail before his eyes." The surgeon is pictured at each visit feeling the pulse and writing a prescription, "for it is a tradition of the elders that at each visit the doctor must do some overt act of medicine". Thus thinks the man in the street, and he is justified to some extent in doing so.

Reference.—[1]*Dublin Jour. Med. Sci.* 1921, Jan.

SYCOSIS.

E. Graham Little, M.D., F.R.C.P.

Prosser White[1] regards this condition as curable by local applications, and thus describes his method: In the management of these skin cases it is well to keep in mind the following points. During the whole of the acute outbursts and the exuding phases of the eruption, treatment must be continuous. To subdue the first and maintain in a sterile state all discharges, constant and unremitting disinfection is required. During the healing and stationary periods stop the applications. Rest and nature must be allowed to complete the cure. *X* rays are unnecessary, and in vaccines the author has little faith. If injections are desirable, manganese may be useful. The lotion used is as follows:—

R Potassii Sulphurati | Aquæ āā ℥iij
Zinci Sulphatis |

Mix these ingredients intimately and add them to 6 oz. of alcohol, about 90 per cent, containing 1 drachm each of phenol, resorcin, and salicylic acid. *Sig.*—This lotion to be frequently and freely dabbed upon the affected parts until the exudation is dry. If it continues, swab with dry cotton-wool and repeat the lotion.

Theoretically, for the sulphide and oxysulphide contained in this mixture, collosal sulphur might be advantageously substituted. Unfortunately the preparations on the market contain too much water, and the makers seem unable to manufacture more concentrated solutions.

The other requisites absolutely necessary are: No shaving or washing of the affected parts must be allowed. The hairs require to be kept closely clipped daily with a sharp pair of scissors. Crusts should not be permitted to form either from the débris of the follicles, or the sediment which dries out of the lotion. If present, these should be washed away by the same lotion.

Reference.—[1]*Clinical Jour.* 1921, March 9, 145.

SYPHILIS. (*See also* Argyll Robertson Pupil; Infectious Diseases Prevention; Mental Disease; Tabes Dorsalis.)

Col. L. W. Harrison, D.S.O.

DIAGNOSIS.

Serum Tests.—Dreyer and Ward[1] have evolved a precipitation test for syphilis which promises to be a great improvement on the Sachs-Georgi method (*see* Medical Annual, 1921, p. 446). It is not practicable to give here the working details of the new test, which is called the *Sigma test.* It may suffice to say that it differs from the Sachs-Georgi mainly in: (1) The extract, which is an alcoholic extract of calf's heart from which the acetone-soluble fraction has been removed and to which cholesterol solution has been added. (2) The dilution of the extract, which is carried out under precise conditions, the saline dropping into it at a constant rate of 34 c.c. in four-and-a-half minutes from a constant height of 36 cm. ; this must ensure greater constancy of the physical state of the diluted extract from day to day. (3) The reading of the results and estimation of the strength of the reaction ; the results are read by artificial light against a dark background, and the strength of the reaction, broadly speaking, is determined by the dilution of serum giving a certain amount of flocculation related to a standard table. The reader who is conversant with serum tests for syphilis will see that, in the precision of the extract and its dilution, the Sigma test offers a prospect of affording more constant results than the Sachs-Georgi test. If, as the authors' results with syphilitic sera indicate, it proves to be as delicate and reliable as the Wassermann test, it may be an improvement on it in affording a more precise indication of the amount of reacting substance in the patient's serum. Further, since only two reagents are concerned, the test is not only more convenient, but offers a prospect of standardization which is not possible with the Wassermann test.

The reviewer had recently an opportunity of seeing *Vernes' test*[2] carried out in its latest form. The hæmolytic system (pig's serum and sheep's cells) has now been eliminated, and the flocculation is determined by optical means. It is therefore now similar to the Sachs-Georgi and Sigma tests, but differs in the extract (made from horse's heart not treated with acetone and not fortified with cholesterol) ; and the dilution of the extract, which is run into distilled water at a constant rate under a constant temperature and the mixture agitated by an electrically-driven glass helix running at a constant speed. The increased opacity produced by the mixture of serum and extract, followed by incubation for four hours, is measured precisely by an optical apparatus, and read off in degrees which are stated to correspond with the weight of precipitate. It seems possible to the reviewer that the best points of the Vernes test combined with the best of the Sigma might prove to be the long-sought-for substitute for the Wassermann test.

The Significance of a Persistently Positive Wassermann Reaction.—Stokes and Busman[3] support Craig in emphasising the importance of a thorough clinical examination in syphilitic patients giving a persistently positive reaction. They submitted to expert clinical examination 101 such patients, all but 4 being late cases (averaging two-and-a-half years). Of the cases, 35 were examined by a cardiovascular specialist, and disease was found in 44 per cent ; of this group, 60 per cent showed signs of aortitis and 60 per cent myocardial changes ; none had a systolic blood-pressure over 140 mm. Of the 70 cases examined by a neurologist, 21 (30 per cent) showed signs of nerve syphilis, 40 per cent of these having general paresis ; 50 per cent were tabetic, and 10 per cent were cases of early cerebrospinal syphilis ; half of the cases in this group had cardiovascular lesions. In 100 cases examined for bone lesions, these were found in 30. Visceral lesions were found in 21 out of 100 ; 52 per cent of these were gastric, 47 per cent hepatic, and 14 per cent splenic. Skin and mucous-membrane lesions were found in 17 out of 100. Congenital syphilis was found in 10 out of 100. No clinical lesion was found in only 10 out of 100. Many of the patients showed lesions of different systems. The authors condemn the modern tendency to regard a persistently positive reaction lightly. They say : " Those who are inclined to interpret Wassermann positiveness as a favourable evidence of a high resistance to the infection, and hence of a probable freedom from complications, it seems to us, must at least subject their material to the most searching and critical examination for every type of involvement before their conclusions can deserve general acceptance."

EXPERIMENTAL OBSERVATIONS.—*The Effect of the Syphilitic Lesion on the*

Development of Resistance.—Brown and Pearce[4] show that, in rabbit syphilis, the more extensive the primary sore, the less likely is the disease to become generalized. Twenty rabbits were inoculated in both testicles, and 14 then castrated. Of these, 13 developed general lesions against 1 of the 6 not castrated. Twenty-seven rabbits were inoculated in one testicle only, and 14 then castrated; again 13 developed general lesions, and (in contrast to the case of the double testicular inoculations) these appeared in 8 of the 13 untreated controls. In 6 rabbits inoculated unilaterally and treated with a single dose of arsenophenyl-glycyl-dichlor-*m*-aminophenol, which suppressed the local reaction for two to three weeks, all developed general lesions by the end of three months, as against 3 out of 6 controls. In 6, inoculated bilaterally and similarly treated the local lesion was suppressed for seven to ten days only; general lesions developed in 4 out of the 6 as against only 1 out of 5 surviving controls in which the local lesions were allowed to develop.

Generally, the experiments showed that the more complete the primary lesion the less likely the development of general lesions. The more completely it was suppressed, short of annihilation of the organisms, the more probable the generalization of the disease. The authors think that the lessons learnt from these experiments may be applicable to human syphilis. In speaking of suppression of the local lesion they are careful to point out that it is suppression by means which do not have an equal effect on the organisms. The same authors discuss in a subsequent paper[5] the factors which determine the diversity of syphilitic manifestations. As is well known, the influence of the seed rather than the soil has latterly been more and more emphasized. Thus Noguchi[6] first suggested the possible existence of different strains of syphilitic spironemes. Levaditi and Marie[7] and Bann[8] and many others have recently contended that a special neurotropic strain is responsible for general paresis (Medical Annual, 1921, p. 455). Brown and Pearce have attempted to throw light on the question by experiments on rabbits. A given strain of spironeme produced different types of generalized lesions, depending on the experimental conditions. Thus one set of experimental conditions was followed by keratitis and iritis, while another produced bone lesions with remarkable constancy. It had previously been shown by Nichols[9] that the development of a lesion in one testicle in the rabbit was capable of inhibiting other lesions, and this was confirmed by the authors' experiments (see above). Two series of rabbits were inoculated with syphilitic virus: (A) In both testicles; (B) In one testicle only. Each series was divided into four groups:—

1. In 6 controls in which the infection was allowed to proceed. In these the unilaterally inoculated rabbits showed generalization definitely three times and doubtfully twice, as against three negative, two doubtful, and one slight generalization in the bilaterally inoculated.
2. In 5 animals of each series the inoculated testicles were removed fourteen days after inoculation. In the A series the generalized lesions were various, but in the B series (unilaterally inoculated) the 4 surviving animals all showed bone lesions.
3. In 5 of each series the inoculated testicles were removed twenty-eight days after inoculation. In series A only 1 showed bone lesions, and in most the skin and eyes were affected. In the series B rabbits of this group 1 died; 1 developed mucous membrane lesions; 1, bone and skin; and 2 were negative.
4. Of each series, 6 were injected with one dose of arsenophenyl-glycyl-dichlor-*m*-aminophenyl, in order temporarily to suppress the local reaction. In both series bone lesions largely predominated, all animals of A group and 5 out of 6 in B.

The authors tentatively offer the explanation of these variations that the effect of the development of a syphilitic lesion may be to confer protection on different groups of other tissues in regular order—bones first, then skin and mucous membranes, then eyes. Stop the full development of the initial lesion without absolutely destroying the spironemes. and the next tissue to suffer will depend on the stage in the development of the initial lesion at which the process was stopped. If very early, before the substances conferring resistance have spread to them. the bones suffer ; if later, the manifestations affect the eyes. The authors admit that rabbit syphilis differs in its clinical manifestations from human ; but the regularity of results in these experiments suggests a possible parallel with human syphilis. and may explain the neurorecidive so common in the early days of arsenobenzol treatment, when the first relapse after an insufficient initial treatment was not a skin or mucous membrane lesion but one of the central nervous system, such as paralysis of a cranial nerve.

Experimental Infection of the Central Nervous System.—Wade Brown and L. Pearce[10] tested the infectivity of the cerebrospinal fluid of rabbits in various stages of syphilis. One out of 5 rabbits with early testicular infection was positive ; 2 out of 3 with actively progressing lesions ; and 0 out of 5 with generalized lesions which were subsiding. In the last-mentioned group (all negative) the fluid showed a very definite lymphocytosis, indicating an antecedent infection with subsequent disappearance of spironemes.

The Risk of Contagion from Latent Syphilis.—F. Eberson and M. F. Engman,[11] after referring to the paucity of experimental work on the infectivity of the secretions of latent syphilitics, relate the following experiments on rabbits.

A. Fourteen lymph glands from latent syphilitics were emulsified and inoculated into rabbits' testicles. Three rabbits died, and 3 developed lesions from the glands of : (1) A female, age 33 ; infected at least eleven years previously ; with a positive blood, and a history of one miscarriage, but a healthy husband. (2) A female, age 19 ; date of infection unknown ; positive blood ; no treatment. (3) A male, age 21 ; infection one year previously ; intensive treatment with '606' and mercury : blood reaction almost negative at time of test. The blood of these three patients failed to infect rabbits.

B. Seventeen specimens of semen from as many patients produced two lesions : (1) Patient, age 39 ; infection thirteen years ; treated with two doses of '606' and pills for three years ; had a rectal stricture, and blood gave a slight reaction. (2) Patient, age 18 ; infection one year ; no treatment ; blood slightly positive.

Seventy-three specimens of blood and thirty-four specimens of spinal fluid from latent syphilitics failed to infect. One-third of the spinal-fluid specimens showed a lymphocytosis. The important result from the point of view of contagion in the above series is that which followed inoculation with the semen of a man infected thirteen years previously.

Persistence of Sp. pallidum in Lymph Glands of Latent Syphilitics.—R. Frühwald[12] reviews much of the literature relating to the discovery of *Sp. pallidum* in the lymph glands by microscopy or by animal inoculation. The finding of *Sp. pallidum* in the glands of early untreated cases showing skin and mucous-membrane lesions is to be expected, as it is easy to find the organism in the lesions themselves. Of more interest is their discovery in latent cases, in 3 out of 14 of which Frühwald demonstrated the organism by g and puncture. Two were comparatively early cases, but the third was in the third year of infection ; the Wassermann reaction was strongly positive, but there were no other signs. He quotes also Buscke and Fischer's case, of two-and-a-quarter years' standing with no sign of syphilis but *Sp. pallidum* in the inguinal glands.

TREATMENT.

Silver-Salvarsan.—C. M. Walson[13] relates his experience with this drug[14] and reviews the recent literature on the subject. In regard to technique of preparation and administration, most workers use a concentration of 1 per cent (0·1 grm. in 10 c.c.), and advise injecting very slowly. The dosage employed varies with different workers. Galewsky[15] commences with 0·05 and works up during fifteen bi-weekly injections to 0·3 for men and 0·25 for women, giving 1·5 to 1·8 grm. in a course. Dreyfus[16] has given 3 to 4 grm. in six to ten weeks. Schoenfeld and Birnbaum[17] start with 0·1 to 0·2, and give men 2·5 to 2·75 in a course. Kolle[18] puts the limit to be given in a month at 2 grm. The Board of American medical officers appointed to investigate the effects of silver-salvarsan recommended as follows: First course, 0·15 grm.; 0·2, 0·3, 0·3, 0·3, 0·3, 0·3 silver-salvarsan with 0·08 grm. **Grey Oil** at weekly intervals. (At a later date the interval was reduced to four days.) Blood test. Thirty days' rest. Second course 0·3 grm. seven times at weekly intervals with grey oil. Blood and fluid test. Two-and-a-half months' rest. Third and fourth courses of injections like the second, with ninety days' rest between courses. Of 133 cases with a negative reaction, 83 remained so, and 50 developed temporarily a slightly or a definitely positive reaction some time during treatment, generally a few days after starting. Of the cases with a positive reaction, 47 out of 55 were negative at the end of the first course, and the remaining 8 after the second. Out of 516 cases, 70 per cent were negative after the first course; a further 25 per cent after the second, and the balance after the third. Opinions vary as to the advisability or necessity of combining silver-salvarsan treatment with mercurial. Galewsky,[15] Hauck,[19] Nolten,[20] and Gennerich[21] all believe mercury to be unnecessary and undesirable during the course of silver injections, and some have given it up entirely. The toxic effects are of the same general nature as those following other arsenobenzol preparations, but most workers seem to have been struck by the frequency of vasomotor symptoms, and practically all agree that they correspond in frequency to the speed at which the injection is given and the concentration of the solution. As a result of 6000 injections reported on by the author, two cases developed an erythema and 4 per cent some albuminuria. Half of these cleared up under treatment. None of the author's series developed argyria. Many workers have been struck by the good effects of silver-salvarsan in neurosyphilis. In 19 cases mentioned by Walson, 17 gave negative fluid after the third course. The two exceptions had been treated irregularly. The author considers silver-salvarsan well worthy of extended trial.

Bismuth.—Sazerac and Levaditi[22] quote Sauton and Robert,[23] who have shown that bismuth possesses a preventive and, up to a certain point, curative, action in hen spirillosis, and also positive results in the treatment of trypanosomiasis. The authors have used tartrobismuthate of potassium and sodium in treating animals infected both with dermotropic and neurotropic virus of syphilis. The results were briefly as follows: Dermotropic virus—0·1 grm. bismuth salt per kilo. intramuscularly; disappearance of spirochætes next day; lesion healed fourth day. Neurotropic virus—0·1 grm. per kilo. subcutaneously; disappearance of spirochætes and complete cure on second day; without recurrence after four months. The same results followed 0·05 grm. per kilo. given subcutaneously. Virus cuniculi—0·1 grm. per kilo. intramuscularly: disappearance of spirochætes on third day. Complete cure without recurrence.

Prophylaxis by Arsenobenzol.—Michel and Goodman[24] state that, in 30 cases where patients have been exposed to infection likely to result in syphilis, they have administered arsenobenzol early in the incubation period to prevent its development. Most of the cases were women whose husbands had been found to be suffering from active syphilis, but they appeared themselves to be still free from signs of the disease. Usually they have given three doses of 0·3 grm. '606' at intervals varying from one to four days, but in one case where it appeared probable that the incubation period was nearly over they gave six injections. In no case have clinical or serological signs appeared. They review the literature on the subject. Taege[25] gives three doses of sodium salvarsan within twenty-four hours, on Scholtz's plan. Fournier and Guenot[26] report on 40 women exposed to infection by men with active lesions containing *Sp. pallidum* and treated with injections of '606', to a total of 1 to 1·2 grm., or of '914'. Only 1 subsequently showed any signs, 20 having been under observation for three years. The single exception continued relations with her lover who had mucous patches, and she contracted a chancre on the face. Lacapère and Laurent[27] relate the cases of three officers exposed to infection by a woman with mucous patches of mouth and vulva. Two received prophylactic injections and showed no further signs; the third took his chance and developed syphilis. These authors relate similar striking instances of the value of arsenobenzol as a prophylactic during the incubation period.

Abortive Treatment.—Meirowsky and Leven[28] hold that, since in primary cases with still negative reaction the spironemes have already invaded the general tissues, it is unsafe to rely only on a single course of treatment, and therefore recommend two or three courses whether the blood is not yet positive or has become so. J. Schaeffer recommends for early primary cases '914' every five to eight days to a total of 3·5 to 4·5 grm., and always repeats this course. Zieler gives 6 to 8 intravenous injections at intervals of four to eight days, and follows up with 4 to 6 after three or four weeks. Pulvermacher recommends 5 grm. in 14 injections, and follows up with a second and third course of 4 and 3 grm. Pinkus gives 7·5 grm. '914' in the first course, but continues by the chronic intermittent method. Meirowsky and Leven indicate that too much reliance should not be placed on a negative Wassermann reaction as an indication for stopping treatment, and show that the general tendency of leading authorities in Germany is to prolong the treatment, though they recognize that the outlook is better the earlier it is begun.

Minet[29] claims most satisfactory results from daily subcutaneous injections of '914'. The dose of 0·15 grm. may be maintained for a course of 10 to 15 injections, or in long-standing, resistant cases increased to 0·3, 0·45, or even more. The dose is dissolved in the least possible quantity of a 4·7 per cent glucose solution containing a little phenol, and injected over the fascia lata in the upper third of the outer aspect of the thigh. At the same time 1 to 3 cgrm. of mercury biniodide or benzoate are injected into the gluteal muscles. After each course an interval of from fifteen days to three months is allowed, during which time potassium iodide is administered.

MacKenna,[30] in opening the discussion on the treatment of syphilis in the male at the meeting of the British Medical Association, warned against undue optimism over a negative Wassermann reaction after treatment, and insisted also on the great importance of an examination of the cerebrospinal fluid before deciding as to cure. His long experience of syphilis had led him to distrust the disease profoundly. Every case encountered in the primary stage should be kept under observation and occasional treatment for at least three years; every case seen first in the secondary stage should be watched and treated for at least four years. He outlined the following scheme of treatment for an adult male suffering from secondary syphilis but otherwise healthy.

" *A.*—A full course of neokharsivan consists of 10 weekly intravenous injections as follows : 0·45, 0·6, 0·9, 0·9 0·9, 0·9, 0·9, 0·9 ; rest fourteen days ; then give 0·9 and 0·9. Total of neokharsivan 8·25 grm.

" *B.*—A full course of Hg injections consists of 12 weekly doses each of 7 cgrm. of 40 per cent grey oil.

" 1. Begin by giving (*A*) and (*B*) simultaneously.

" 2. Wait a month ; then test blood and cerebrospinal fluid. If both are negative, test again in three months. If still negative, wait three months, then give half (*A*) and half (*B*).

" 3. If reaction is positive at the first test, after completion of the first course, give one-half (*A*) and (*B*) in its entirety ; and repeat if necessary at the end of three months until the Wassermann reaction becomes negative.

" *Second Year.*—Even in the absence of all symptoms, the Wassermann being negative, give one-half (*A*) and (*B*) in its entirety. This course may be divided into two parts and given at intervals of six months.

" *Third Year.*—No symptoms ; Wassermann negative. Give one-third (*A*) and (*B*) in its entirety with potassium iodide for three months, dividing the treatment up over the year.

" *Fourth Year.*—No symptoms ; Wassermann negative. Give one-quarter (*A*) and (*B*) in its entirety with potassium iodide for three months, spreading treatment over the year.

" In all cases the blood and cerebrospinal fluid should be tested at regular intervals.

" The scheme may be modified at any stage to meet the requirements of the individual case. A case met with in the primary stage would, in all likelihood, require less intensive treatment, while a tertiary case will need less arsenic and more potassium iodide.

" To those who may consider that the amount of treatment suggested is excessive, I would say that it is better in dealing with a disease like syphilis to err on the side of too much rather than of too little treatment. We have not yet succeeded in determining the golden mean."

Harrison[31] agreed with MacKenna that the modern preparation is not a patch on the original '606' for therapeutic activity. He preferred silver-salvarsan to '914' for intravenous injection. Referring to the inveterate Wassermann reaction, he had found that, if the serum is tested out to an end-point, the effect of treatment is manifest, and indicates that the reaction in these cases depends on spirochætal activity. For all such cases in those who were in the active years of life he would continue treatment.

Effect of Treatment.—Rohdenburg, Garbat, Spiegel, and Manheims[32] have followed up 148 cases of syphilis for at least five years. The treatment adopted was as follows : From 1912 to 1916, six injections of '606' given either weekly or bi-weekly, then ten injections of mercury salicylate (1 to 2½ gr.) ; six weeks' rest ; repetition of the courses of injections and six-weekly rests for two years, irrespective of the blood reaction. From 1917 all early cases have been treated by Pollitzer's intensive method, viz., daily injections of '606' for three days (in a dose of 0·1 grm. per 30 pounds weight) ; six weeks' rest ; repetition of the injections and rests for two years, and two courses of '606' (four injections) in the third year. The results are shown in the table on p. 428, where 'serologically cured' means negative for three years from cessation of all treatment. The authors consider, however, that this standard may not be sufficiently severe, as they have noted five patients in whom the blood returned to positive after being continuously negative for three years.

The authors lay stress on the powerful influence of the first period of treatment, and mention in support of this that, in the early cases, three months' treatment had reduced the percentage of positive reactions in early cases from 92 to 8, but this had risen to 14 per cent by the end of two years, and was not reduced by further treatment. In late active cases the reactions were reduced by three months' treatment from 90 per cent to 21, but gradually rose to 51 per cent by the end of three years' treatment. The late latent cases showed 100 per cent positive before treatment; 34 per cent after three months; and 47 per cent after three years. [It appears as if the treatment outlined above required revision, possibly in the direction of greater intensification in the earlier stages.—L. W. H.]

SUMMARY OF CASES.

Type of case	Number	Percentage serologically cured
Abortive	3	100
Early	48	86
Late active ..	85	49
Late quiet	12	53

Resistance to Arsenobenzol Treatment.—Lutz[33] relates two cases in which the symptoms remained refractory to '606'. One died of leptomeningitis and the other reacted to silver-salvarsan. That the cause did not lie in an arsenobenzol resistant strain of spironemes is shown by the fact that others infected from the same source responded to treatment in the ordinary manner. The author attributes the cause to failure of the patients' tissues to make use of the '606'.

MARRIAGE OF SYPHILITICS.

A commission appointed by the Société Française de Dermatologie et Syphiligraphie, and consisting of MM. Queyrat, Hudelo, Spillmann, Gastou, and Cl. Simon, has recently reported[34] on the question of marriage of syphilitics. They find that marriage can be allowed under the following conditions:—

1. Primary cases with negative Wassermann reaction must receive (*a*) a series of increasing doses of arsenobenzol totalling 3·50 grm. '606' or 4·50 grm. '914' in about two months; (*b*) a second similar series commencing one month from the termination of the first; (*c*) 8 injections of an insoluble preparation of of mercury commencing a month later. Assuming that the blood-serum has remained negative to the Hecht modification of Wassermann's test throughout, a month's rest is given, and the blood and cerebrospinal fluid are then tested. If all remains negative for a year under tests at two-monthly intervals, a provocative injection is given followed by a final blood test. If this proves negative the cerebrospinal fluid is examined. By this time two years have elapsed from the commencement of treatment, and if all tests have proved negative the patient is allowed to marry.

2. Early cases where the Wassermann reaction has become positive. In these, treatment by arsenobenzol and mercury, on the same lines as in earlier cases, is continued for two years, followed by two years' observation.

3. Cases with persistently positive Wassermann reactions are treated for four or five years and then allowed to marry if the cerebrospinal fluid is normal and they are men. In the case of women two more years should elapse, and the treatment be renewed at each pregnancy.

4. Cases with positive fluid in spite of prolonged treatment. In these

marriage is forbidden not so much from fear of contagion as of tabes and paresis. If the fluid subsequently becomes negative and remains so for two years, marriage is permitted.

5. Cases with signs of nerve disease are forbidden to marry.

Amongst other recommendations is that of treating the wife of a syphilitic when she becomes pregnant, though she shows no signs.

In the subsequent discussion Lacapère held that the Commission had not distinguished sufficiently between the cases of men and women. The former he considers dangerous only during the period of manifestations when he is able to contaminate his consort. Women, on the other hand, may be energetically treated and give birth to children who are clinically and serologically healthy but succumb later to the slightest infection. Leredde held that all hereditary syphilitics should be treated whether negative or not, and should not be allowed to marry except after an energetic treatment. Jeanselme held that a persistently negative reaction does not prove cure. This view was contested by Queyrat, who considers that, if the test has been carried out by the more delicate Hecht method and the reaction is persistently negative for the periods mentioned above, it is justifiable to consider the patient as cured. [It appears to the reviewer that since there is no absolute proof of cure, the question turns on the periods during which an infected man can remain infectious to his consort and an infected woman to her offspring. It is generally agreed that in the great majority of cases the infectivity of the man ceases after four to five years, so that this seems the most reasonable period of treatment and surveillance. A woman, on the other hand, may transmit to her offspring for very many years after infection, and it does not seem possible at present to recommend marriage except on the condition of continued treatment, at any rate throughout each period of gestation.—L. W. H.]

TOXIC EFFECTS OF ARSENOBENZOL AND MERCURY.

It is well known that antisyphilitic remedies are occasionally followed by certain serious disturbances which may be fatal. The chief are vasomotor symptoms; cerebral, with fits and coma; skin reactions in the form of urticaria, erythema, and exfoliative dermatitis; liver disturbances, manifested by benign jaundice and occasionally acute yellow atrophy; and nephritis. The causation of these disturbances has aroused considerable discussion, especially those referable to the central nervous system, the liver, and the kidney. Some authorities maintain they are due to the syphilis; others attribute them to the arsenobenzol, alone or assisted by other agencies such as microbial invasion; and still others hold that the mercury is largely responsible. Kolmer and Lucke[35] have recently conducted a valuable research into the histological changes following the injection of '606', '914', and mercury respectively, into animals, which may throw some light on the effects of these remedies on the tissues of human beings. The original must be consulted for details of the histological changes, which they describe very fully, since the space here permits only of reviewing their general conclusions.

Most interest must naturally centre round the changes in the animals which received multiple small doses, though these were larger and more frequently administered than would be the case in man, equivalent to 0·6 grm. per 60 kilo. weight every third day for six to seventeen doses. The changes were most marked in animals receiving most injections. The cerebral tissues showed very slight changes, but occasionally small thrombi and extravasated red cells were seen, and the vascular endothelium was sometimes swollen. Rats showed minute hæmorrhages in places. The lungs had tortuous capillaries densely packed with red cells, and the whole picture suggested passive congestion of moderately long standing. Sometimes the larger pulmonary vessels contained thrombi. The changes in cats were less marked than in the rabbits. The heart showed multiple areas of focal necrosis which were mostly small and appeared to be due to small infarcts. In the liver was slight periportal fibrosis with small areas of focal necrosis, especially in the peripheral portions of the lobules. The fibrosis was mostly confined to tissue about the blood-vessels. Focal necrosis was more marked in the rats. The kidneys showed vascular changes, especially in the cortical and outer boundary zones. The tubules, mostly the convoluted, showed cloudy swelling of the epithelium, with degenerated nuclei, and here and there, in animals which had received the maximum number of injections, some slight connective-tissue increase. There was no frank necrosis.

The suprarenal changes varied apparently with the number of injections. At first there was an increase of cortical lipoid ; later a slight lipoid exhaustion was apparent. In the medullary portion many cells were shrunken and there was slight evidence of chromaffin depletion. The spleen also showed focal necrosis. Altogether the primary effect of '606' is on the vessels, but the authors express the view that, though some of the necrotic changes are attributable to thrombosis, some are caused by direct action of the drug on the parenchyma. The changes correspond closely to those found by Ullmann,[36] working with salvarsan of German manufacture. The authors' results were produced by '606' of three different American makes.

Experiments with '914' showed changes of the same nature but of less severity. Experiments with mercury in all forms, in maximum doses, and by all routes, produced the most conspicuous changes in the brain and the kidneys. The former showed perivascular round-celled infiltrations, and the kidneys tubular and capsular glomerulonephroses of varying severity. The bowel was not examined. The degree of injury was proportional to the amount of pure mercury administered, whatever the preparation or the route.

Schamberg[37] makes a valuable commentary on the experimental results of Kolmer and Lucke. He discusses the liver effects, and advances the theory that these are the result of giving mercury contemporaneously with arsenobenzol, the mercury, by its effect on the kidneys, interfering with the elimination of the arsenobenzol and allowing it to become anchored to the liver-cells. In support of this he states that in his own clinic over 12,000 injections of '606' and '914' have been followed by only three cases of jaundice and two mild cases of exfoliative dermatitis ; there have been no cases of acute yellow atrophy or encephalitis. His dosage is fairly high and frequent, viz., two of 0·4 grm. '606' or of 0·9 grm. '914' per week, sometimes for seven to ten weeks without interruption. In his own private practice the dosage has at times been even more energetic. He concludes that arsenobenzol is less toxic than mercury, and, even though quicker results might be obtained by giving both remedies contemporaneously, it is safer to withhold the one whilst the other is being administered.

Moore and Keidel[38] have made a study of untoward effects of arsenobenzol injections, based on 23 cases of dermatitis with 5 deaths, which occurred amongst 9,000 cases of syphilis after 47,000 injections. The incidence of toxic effects was considerably greater amongst white patients than coloured, the proportion being 18 to 5. The stage of the disease appeared not to influence the incidence, and no preparation of arsenobenzol appeared more prone than others to excite reaction. Only 5 of the 23 cases had received treatment by mercury or iodides, which is interesting in connection with the assertion by various authors, including Schamberg mentioned above, that mercury plays a more or less prominent part in the toxic effects usually attributed to arsenobenzol treatment. The authors rightly draw attention to the importance of taking warning from slight signs of intolerance, and instance five cases in which injections were continued with serious results after malaise, a slight rash, or a stomatitis had developed. In the authors' cases a course consisted of six doses of 0·4 grm. '606', or equivalent in '914', at weekly intervals; then six weeks to four months of mercury; six more arsenobenzol; and so on. The blood picture was interesting, and its study in 16 cases was a strong feature of this report. In only 1 case was there a disturbance of the red-cell formation: this patient developed aplastic anæmia. A striking feature was the leucopenia with decrease of polynuclear leucocytes, which may even disappear. Lymphocytes were largely unharmed, but eosinophilia was marked in 10 cases, the percentage sometimes reaching 56. In some cases there was a large increase of transitional cells (50 per cent), and in these the eosinophilia was usually not so pronounced. Myelocytes and myeloblasts were present in some of the cases. Eosinophilia has been noted by other workers and attributed to the skin reactions, but the authors say that it occurs in arsenobenzol-treated cases with no skin lesions. They attribute the blood changes to selective damage of the bone-marrow, the mildest cases showing eosinophilia only; rather more severe cases, decrease of polynuclears with eosinophilia; still more severe, decrease of polynuclears and eosinophiles with increase of transitionals; and in the worst cases, disappearance of all leucocytes originating in bone-marrow, with practically only lymphocytes and shadows in the blood picture. They regard this bone-marrow damage as responsible for the loss of resistance to bacterial invasion which is shown by cases of dermatitis. In fatal cases the necropsy findings agree with those of other authors, a marked feature being the innumerable hæmorrhages in lungs, gastro-intestinal tract, and kidneys.

Hunt[39] has conducted a number of animal experiments to determine what it is in arsenobenzol compounds which causes certain toxic effects. Ehrlich attributed these to *m*-amino-*p*-hydroxy-phenyl arsenous oxide, and some have attributed the toxic effects which are familiar to all workers to an abnormal content of this 'arsenoxide' in the preparation employed. Hunt states that he has not encountered a preparation the toxic effects of which could be attributed to this cause. If a solution of arsenobenzol is partially converted to 'arsenoxide' by shaking in air, its injection into rats gives rise to symptoms which are of a different order from those commonly seen, viz., struggling, convulsive movements, rigidity of legs, irregular respiration, and protrusion of the eyes, all commencing during the injection. Incidentally further aeration with heat reduced the toxicity again, the 'arsenoxide' being converted to *m*-amino-*p*-hydroxy-phenyl-arsenic acid. The author found no confirmation of the statement by Ehrlich and Bertheim[40] that the formation of a sulphide of arsenic in the process of reduction by hydrosulphite accounted for the high toxicity of some samples. The symptoms of arsenous sulphide poisoning are easily recognizable as of a different order (like arsenoxide symptoms) from those ordinarily seen, and require, moreover, a far higher dose of sulphide than is contained in the ordinary dose of arsenobenzol. Hunt's work helps to confirm the view of the Salvarsan Committee[41] that the physical state of the remedy on entering the circulation is responsible for some toxic effects. The author found that warming the solution, instead of increasing the toxicity, as is commonly taught, very often decreased it. Similarly these preparations became less toxic on standing. In the case of preparations which became less toxic on warming or standing, the toxicity of unheated specimens was maintained for some hours by standing in the cold, though if previously warmed and then stood on ice the loss of toxicity resulting from the warming was maintained. The author suggests that, when a number of patients receive arsenobenzol injections from the same batch and only one or two show reactions, these may not be due to idiosyncrasy but to the fact that these patients had received the remedy when quite freshly prepared, while the others who escaped had been injected with solution which had become fairly stable by standing.

Hyman[12] reports a fatal case of 'jaundice' following a single dose of 0·4 grm. '606', but the account of the case makes it apparent that the jaundice was hæmatogenous. About five days after the injection the patient, a female, began to suffer from increasing malaise, and a month later was slightly jaundiced. The jaundice increased, the patient became progressively feebler, and purpuric spots appeared all over the skin and visible mucous membranes, with coffee-ground vomit and occult blood in the stools. Eventually the patient died, and at the necropsy were found numerous visceral hæmorrhages. but the liver appears to have shown none of the changes usually associated with acute yellow atrophy. [A much milder case of purpura after a single injection of '914' occurred some months ago at St. Thomas's Hospital in one of Anwyl Davies's cases, also a female. The purpuric spots appeared on the legs a few days after the injection, but did not spread, and the patient made a good recovery. Cases of this kind must be very rare, and it is usually the cerebral or renal capillaries which give way. Arsenobenzol compounds damage vascular endothelium, the most serious effect being thrombosis of capillaries, with small extravasations of blood, as is seen in the condition known as encephalitis hæmorrhagica, and in hæmorrhagic nephritis, from which the patient may die in coma within a few days of the injection. Petechiæ are often seen in the skin in severe cases of dermatitis, and in fatal cases submucous ecchymoses are found throughout the gastro-intestinal tract. The resistance presented by the vessels of different patients to the action of the arsenobenzol compounds evidently varies very widely, ranging from tolerance of many repeated doses of 0·6 grm. '606' to intolerance of as small a dose as 0·3 grm. '914'. Patients of the latter class are very rare; fortunately so, because no test has yet been discovered by which they can be detected beforehand.—L. W. H.]

Lochte[13] reports a case of argyria following twelve injections of silversalvarsan. The patient had developed jaundice five days after the first intramuscular injection of 0·2 grm., but treatment was continued as the patient appeared to feel generally well.

J. Elliott[14] advises the following precautions against toxic effects of antisyphilitic treatment: (1) Watch the case carefully, and stop treatment at once if the patient complains of feeling ill; (2) Give liq. adrenalin. chlorid. (1–1000) 25 min. in water twice daily, with two intermediate doses of calcium lactate, 20 gr. on the day of the injection and for two or three days after; (3) Where mercury is given simultaneously, order a teaspoonful of sublimed sulphur to be taken each bedtime; (4) Give a simple diuretic, e.g., barley-water or whey. He holds that if these simple directions are carried out, less will be heard of salvarsan poisoning.

Detection of Intolerance.—After a patient has recovered from an arsenobenzol dermatitis it is often a problem to determine if and when the arsenobenzol treatment can be resumed. Stuart and Maynard[15] suggest that the intradermal injection of sufficient 1–1000 solution of '606' or '914' to produce a wheal 3 to 4 mm. in diameter may be a means of detecting a persisting intolerance. In 2 out of 3 cases which had suffered some months previously from dermatitis, there appeared six to eighteen hours after the intradermal injection an elevated, indurated nodule about the size of a dime, dark-red, itching intensely, and surrounded by an outer zone 3 in. in diameter, composed of papules.

The redness increased for about forty-eight hours, persisted for eleven days, and then subsided. In 23 controls there was no greater reaction than a fleeting erythema and a minute papule or macule persisting for two or three days.

VISCERAL SYPHILIS.

Recent years have been marked by an increasing interest in the problem of visceral syphilis, and this is doubtless due to the precision of modern diagnosis, with the rapidity of action of arsenobenzol remedies. The Wassermann test has often pointed to the possibility of the patient's vague symptoms having a syphilitic origin ; the precise instruments of modern medical diagnosis have shown the existence of structural alteration where formerly diathesis or dyscrasia was blamed : and the amelioration following arsenobenzol treatment has converted the suspicion to certainty. All these are responsible for the strongly growing conviction that many vague visceral disabilities have a syphilitic origin. From the rapidly growing literature on a subject which has been comparatively neglected in the past, the following have been selected :—

Allbutt,[46] opening the B.M.A. discussion on visceral syphilis, reminded his audience of much that is often forgotten. It is impossible here to do justice to this paper, but the following are a few of the main points emphasized. Invasion of the lymphatic system throughout the body occurs very early. Thus Eicke and Schwabe have collected cases from the literature, and cite one of their own, in which (sudden death giving the opportunity of an examination) the mediastinal, mesenteric, and other lymph glands were found to be already infected very early in the primary stage (see experimental evidence reviewed above). It is a mistake to regard aortitis as a late event in syphilis ; the virus. reaching the aorta along the rich lymph irrigation system about the base of the heart where the pericardium is reflected upon the aorta, attacks it from without very early in the disease ; added to this the aorta suffers from lymph-arteritis of its vasa vasorum, producing small gummatous nodules and patchy degeneration of the walls, which often spreads to the intima but is distinct from atheroma. Pathologists report the aorta diseased in 70 to 76 per cent of syphilitics, and the left subclavian suffers six times as often as the right. Pericardial gumma is a post-mortem discovery ; its usual seat is in the auricular or ventricular septum, below the aorta and behind the tricuspid valve. whence it may invade the *a.v.* bridge and cause heart-block. In the myocardium gumma prefers the left ventricle, where it may not interfere very much or may lead to cardio-aneurysm. The valve most frequently affected is the aortic in association with aortitis. Syphilis of the lung may not be so rare as is generally thought, and it may also be a complicating factor in tuberculosis. Besides the massive gumma and miliary granuloma, which are rare. syphilis may cause a cavity in the apex. It is prone to spread from the root along the bronchi, so that an appearance of bronchitis in a syphilitic should be regarded with suspicion, since delay in treatment may permit of irreparable damage. The author touched lightly on syphilitic affections of the liver as too well known to require further comment. Dealing with the stomach and intestines, excluding the rectum, he said that these organs seem to escape generally in the acquired disease, a view which the investigations of other workers appear likely to change. He showed, however, a photograph of syphilis of the stomach from a man, age 57 (case of Prof. Elliott and Dr. McNee). The diagnosis had been carcinoma, but the histological appearances were typical of syphilis, and spironemes were found in abundance in the acute part of the ulcer. In the discussion following, E. S. Reynolds emphasized the importance of following up the clue provided by the queerness and capriciousness of the signs and symptoms often seen in syphilis of the viscera by a thorough clinical examination, and instanced many cases where this had served him well. He rightly said that laboratory aids cannot replace the clinical examination. They are in fact good servants but bad masters.

J. Eason,[47] discussing the anæmias of syphilis, quotes Biermer as the first who noted splenic enlargement in early syphilis. Wile and Elliot[48] found a splenic tumour in 36 per cent of early syphilitics. In 14 out of 27 cases there was a leucocytosis of 10,000. Eason quotes Soukernick, who in 1896 found enlargement of the spleen in 60 per cent of his cases. In regard to the anæmia of early syphilis the author mentioned a number of his own cases with a much more severe degree of oligocythæmia than is ordinarily seen. These showed normoblasts and megaloblasts with, sometimes, eosinophilia and neutrophile myelocytes. The anæmia was grave in all, about 1,000,000 red cells and a colour index at or above 1. [Severe anæmia is not confined to the secondary stage. I have seen one in a case of twenty-nine years' standing with 1,700,000 red cells ; colour index 1 ; 1800 leucocytes ; and some poikilocytosis, in which arsenobenzol treatment restored the blood-count fairly quickly to 4,800,000 red cells.—L. W. H.] The author discusses the chronic splenomegaly of late syphilis. This resembles Banti's disease very closely, but the spleen and liver may, inconstantly, be tender. Spironemes are found in the excised spleen. In 6 cases collected from the literature and 1 of the author's, antisyphilitic treatment does not seem to have been a very great success. In 1 the general condition became worse ; in 2 there was no improvement ; in 3 some improvement occurred ; and in 1 the Wassermann reaction became negative.

Letulle[49] draws attention to the frequent association of hepatic cirrhosis with syphilis. In 154 cases 74 gave a positive Wassermann reaction. The cirrhosis is associated with syphilitic peritonitis, and this plays a prominent part in the ascites. He concludes that antisyphilitic treatment should be tried in all cases of hepatic cirrhosis.

Incidence of Syphilis in Pregnant Women and Suckling Infants.—Nobécourt and Bonnet[50] have dealt in their Maternity Hospital with 801 infants and 1185 mothers, the former mostly under six months. They have tested 171 infants and 276 mothers for Wassermann's reaction, and found 18·71 per cent of the infants positive, and 18·84 per cent of the mothers. The proportion of positive infants includes those who gave a negative reaction at first and subsequently became positive. On these results they say that, assuming all or almost all those not examined to have been negative, as is very probable [though why is not very clear.—L. W. H.], 4 per cent of the 801 infants were positive, and 4·38 per cent of the 1185 mothers. In support of their estimate, the authors quote the work of Astros and Teissonière, who found that 4 per cent of 500 *crèche* infants, age from a day to fifteen months, gave positive reactions. Amongst Nobécourt and Bonnet's negative mothers were only two with obviously syphilitic infants, and they raise the question of paternal syphilis in these cases. In some of the negative mothers syphilis was admitted, but had been treated, and the infants were mostly negative, both clinically and serologically : in others, the mothers' syphilis was hereditary and infants were uniformly negative. In many cases infants were negative and mothers positive. One of these mothers was a congenital syphilitic, and 4 had been infected in the sixth, seventh, and eighth months of gestation. Some of the negative infants suffered from various stigmata, e.g., hypotrophies ; premature birth ; large fontanelles ; craniotabes ; thickening of cranial bosses, which raised the question of syphilis ; but the authors think that syphilis was eliminated by other evidence, including the negative reactions of the mothers. In regard to the relation of syphilis to various dystrophies, they quote Barbier, who found a positive reaction in

33 per cent of such cases, and a suspicious history in a further 9 per cent who were negative. Also Lesage and Kouriansky,[51] who found that 25 to 35 per cent of infants with various disorders of nutrition gave a positive reaction. Nobécourt and Bonnet found in their cases of dystrophy and atrophy of various kinds with a negative reaction that, except in 5, specific treatment failed to improve. At the same time they warn against accepting a single negative reaction as proof that the case is not syphilitic, since, as they say (in agreement with most workers), the reaction may become positive later. They recommend provocative treatment, e.g., six to eight inunctions, before testing the blood. In regard to the incidence of positive reactions in the parents of hereditary syphilitics, they quote Leroux and Labbé, who found 72 per cent in the mothers and 41·2 per cent in the fathers, and attribute the difference to the fact that syphilis is less frequently recognized and treated in women than men. In only 10·29 per cent of cases was a discordance eventually found between the reaction of the mother and that of the infant, and in most of the cases it was the mother who was positive.

Williams[52] recalls that in 1915, as a result of a study of 10,000 consecutive deliveries, he stated that 26 per cent of the fœtal and infantile deaths in his service between the seventh month of pregnancy and two weeks following delivery, were the result of syphilis. Following on this he has made a study of 4000 cases of pregnancy. Each patient at her first visit is subjected to a Wassermann test, and if this is positive she is put on treatment. A sample of fœtal blood from the cord is also tested, and the placenta is examined histologically for *Sp. pallidum*, as also are the tissues of still-born infants. The 4000 cases consisted of 1839 whites and 2161 blacks. A study of 302 fœtal deaths, 99 whites and 203 blacks, showed that syphilis was the cause of fœtal death in 12 of the 99 white deaths and 92 of the 203 black. The Wassermann reaction was positive during pregnancy in 449, or 11·2 per cent, of the 4000 mothers. The blacks had 16·29 per cent positives and the whites 2·48 per cent. As a result of a careful analysis of his figures the author comes to certain interesting conclusions, amongst which are the following: (1) A positive reaction in the mother does not necessarily mean that syphilis will be transmitted. Thus, 87 children of 169 positive untreated mothers (51·5 per cent) were either born healthy or showed no sign of syphilis at necropsy, and none of the placentæ showed signs of syphilis. (2) A syphilitic placenta (found in 19 cases) does not necessarily mean that the child is syphilitic; thus, in 4 cases the children were healthy, and in 2 others no signs of syphilis were found on necropsy. (3) Treatment instituted on the discovery of a positive reaction in the mother is beneficial for the child. Thus, in 102 cases inefficiently treated, 66·8 per cent of infants were born apparently healthy; and in 178 well-treated cases, 93·6 per cent of the infants showed no signs at birth or after. The results might be expressed thus:—

No treatment of the positive mother results in 48·5 per cent syphilitic infants.
Inefficient .. .. ,, ,, 33·2 .. ,, ..
Good .. .. .. ,, 6·4 .. .. ..

(4) Out of 109 women with a history suspicious of syphilis but whose Wassermann reaction was negative, 44 had been treated previously and had normal placentæ and infants; 65 others gave birth to 54 dead and 11 living infants. Of the 54 dead infants, 40 proved to be syphilitic on autopsy; in 3 there were no signs of syphilis, and 11 were not examined post mortem. Of these 11 cases in which the infant was not examined post mortem, 7 had syphilitic placentæ (*Sp. pallidum*), and 4 had normal. Of the 11 infants born alive, 3 showed signs of syphilis and 8 appeared normal. The author's interpretation is that, in

about 1 per cent of births, the infant will be syphilitic though the mother's reaction has been negative. (5) Only a small fraction of the infants born of mothers with a positive reaction give a positive reaction at birth. Out of a total of 38 born with a positive reaction, 29 were followed up: 17 developed clinical evidence of syphilis, 5 retained the reaction without other signs, and 7 lost the reaction without showing signs of syphilis. On the other hand, a negative reaction at birth is of no prognostic significance, as it may become positive later. In this connection the author quotes Fildes, who in 1915 found a positive reaction at birth in 14 out of 1015 infants (1·3 per cent). Only 1 of these subsequently showed signs: 7 gave a negative reaction at a later date; and in 3 of the negative cases the reaction became positive at a later date. He agrees with Fildes that the investigation of the fœtal blood at birth is not worth the trouble. (6) Out of 397 cases in which the placenta was normal there were 364 normal infants; agreement in 91·6 per cent. Out of 110 cases in which the placenta showed signs of syphilis there were 87 syphilitic infants; agreement in 79·1 per cent. From this it appears that examination of the placenta affords accurate information of the condition of the infant in 80 to 90 per cent of cases, in contrast to the Wassermann test, which is right in only 40 per cent. (7) Amongst certain cases which the author quotes in support of paternal transmission and Colles's law is one which is very suggestive. A coloured patient at her seventh pregnancy (the six others having been normal) gave birth to twins, one of which was still-born and proved on necropsy to be syphilitic, while the other was apparently normal; one placenta was syphilitic and the other normal. The mother had had intercourse both with her husband who was normal, and her lover who was under treatment for syphilis. Subsequently the mother had eleven full-term labours with live children and normal placentæ, and eight years after the birth of the twins both husband and wife gave negative reactions.

SYPHILIS AND INSANITY.

O. Berkeley-Hill[53] has examined by the Wassermann test the whole population of the Ranchi European Lunatic Asylum, India. The inmates are lower middle-class Europeans and Eurasians, chiefly drawn from the larger towns. None of the 186 patients tested were paretic, and 39·24 per cent gave a positive reaction. This is enormously greater than was found by Hammond at the New Jersey State Hospital, who found only 2·7 per cent positive in 1583 persons. The author attributes the high percentage to the small number of cases examined, the absence of previous treatment, their urban origin, as opposed to the rural origin of those in the New Jersey State Hospital, and the high proportion of the sane, middle-class European and Eurasian population of Northern Central and Eastern India who are syphilitic. With regard to the last point, he states that a huge proportion of the unmarried women of the community are syphilitic, and relates having been told by an officer of the Indian Medical Service with a long and special experience, that he believed 75 per cent of the native population of India to be suffering from syphilis, either inherited or acquired! The reader will recall that an investigation on the same lines was undertaken for the Royal Commission on Venereal Diseases.[54] Out of 505 non-paretic cases, 10·2 per cent gave a positive or partially positive (7 cases) reaction. Another investigation (*Ibid.*, p. 143) by Candler and Mann showed 10·2 per cent of 480 insane non-paretics positive: 9·2 per cent of 454 sane apparently healthy men; and 19·9 per cent of 1483 sane infirmary patients. These results appear to indicate that the percentage of syphilis amongst insane non-paretics is little or no greater than that of the population from which they are drawn.

SYPHILIS OF THE CENTRAL NERVOUS SYSTEM.

G. L. Dreyfus[55] reviews his experience of 1067 syphilitic patients studied during the past ten years. He seeks to answer the following questions, which are of importance to everyone interested in syphilis :—

1. The behaviour of the spinal fluid in each stage.
2. The prognostic and therapeutical significance of the results of an examination of the spinal fluid.
3. The behaviour of pathological fluid during and after treatment.
4. Whether there is any relation between clinical findings and changes in the fluid.
5. The comparative value of the different reactions given by the spinal fluid.
6. When should the spinal fluid be examined, and is it necessary in every case ?
7. Is one to regard the state of the fluid merely in the light of a symptom, or is it the decisive factor ?

With all reserve, having regard particularly to the shortness of the time during which he has conducted his observations, he comes to the following conclusions on these points. He considers as normal a fluid with a pressure of 150 to 180 mm. water ; with at most $\frac{5}{12}$ per thousand albumin ; globulin 0 to 1 ; cells 5 or less per c.mm. ; Wassermann and goldsol reactions negative. He regards the patient with pathological fluid as a candidate for future nerve trouble. Changes in the early stages may resolve without treatment, but he has never observed this in the later stages. Fluid changes in the clinically latent stage of syphilis mean active disease of the nervous system, though nothing can be said as to the manner and rate of its progress. A positive Wassermann reaction is the most severe sign, especially when it is given by the smallest quantities of fluid (0·1 to 0·2 c.c.). Such cases are also most difficult to influence by treatment. Slight goldsol reactions with otherwise normal fluid are of no moment in the latent stages.

Out of 72 cases of syphilis of various stages with clinical lesions but no clinical sign of nervous disease, he found fluid changes in 80 per cent [a high figure in comparison with the 30 to 50 per cent usually given.—L. W. H.]. A negative cerebrospinal fluid in the early stage can easily become pathological even during treatment, especially when the latter is insufficient (less than 5 grm. sodium salvarsan or 2·5 grm. silver-salvarsan in a course). In fact, amounts of 1 to 2 grm. arsenobenzol are distinctly provocative of pathological changes. Fluid changes in the early stages are easily remedied, but the treatment must be thorough, with four courses of injections at intervals of not more than five to six weeks. If the interval is too long the fluid may easily return to pathological. The first course should be particularly thorough (10 grm. sodium salvarsan or 5 grm. silver-salvarsan, if possible). The second, third, and fourth may be lighter. A negative fluid at the end of the first course is of no value whatever as an indication for stopping treatment, but a negative at the end of a year from suspension of all treatment is a pretty good guarantee of immunity from trouble in the future.

In latent cases without clinical signs of nerve disease, he found in 260 cases : 168 with positive Wassermann of the blood ; 31 with positive Wassermann of the fluid ; 50 with some degree of pleocytosis ; i.e., about 19 per cent with positive fluid. Never has he found a negative fluid in a latent case become positive later, and he considers that Plaut's case of this kind must have been a rare exception. In some of the cases with negative blood the fluid changes were severe. It is interesting that the percentage with pathological fluid was so low, considering that at least 65 per cent had been treated insufficiently as judged by the blood reaction. Dreyfus does not agree with Kyrle that pathological fluid in the latent stage is not necessarily of grave portent. He has seen such cases go on too often to grave nerve disease.

In early syphilis of the brain (neurorecidive cases) treated with salvarsan the Wassermann reaction of the blood was often negative though the fluid changes were very marked. Often the fluid changes are better after the first course, but relapse unless the treatment is continued, and he considers that at least four and sometimes more courses of 8 to 10 grm. each at intervals of six to eight weeks are necessary to make the fluid permanently negative. If the fluid is normal nine to twelve months after the fourth course, it is a fair guarantee against further trouble.

Cerebrospinal Syphilis.—In some cases of cerebral endarteritis the fluid may be normal. Otherwise a negative fluid in the presence of symptoms means a process which has healed. Dreyfus has followed up many such for years and discovered no new symptom, and the fluid has remained normal. On the other hand, a positive fluid has heralded sooner or later clinical signs or symptoms of nerve disease. The moral is to treat those with positive fluid and not the negative cases, unless the signs indicate an endarteritis. The treatment must be energetic as in the cases of neurorecidive ; at least four courses should be given at intervals not greater than three months.

In tabes he found severe changes in 89 per cent (of 327 cases), a Wassermann reaction being given by 0·2 c.c. fluid in 53 per cent of these, and by higher amounts to 1·0 c.c. in 36 per cent, while 11 per cent were negative. Contrary to the case of cerebrospinal syphilis, a negative fluid does not necessarily mean a healed tabes. though, in Dreyfus' experience, such cases are much slower in progress. He has succeeded, by 1–10 courses, in reducing the fluid to normal in 14 cases. Those which have become negative tend less to relapse than other forms of nerve syphilis. The effect of the treatment may continue after its suspension ; thus, cases were seen with positive fluid at the end of a course, and negative months, or even years, later. An increase in pathological changes in the fluid is not necessarily accompanied by corresponding increase of symptoms. The treatment, though conducted with a mild dosage, must be prolonged—three course in the first year, two in the second, and some in the third, fourth, and even fifth years.

Early Involvement of the Central Nervous System.—Wile and Hasley[56] examined the fluid of 221 cases of primary syphilis and found pathological changes in 49, with slight pleocytosis in 11 more. The changes consisted in increased globulin and albumin in 25 ; pleocytosis in 12, and positive Wassermann in 8. These results confirm Wile and Stokes's[57] earlier discovery of pathological changes in the fluid of six primary cases, and also Wechselmann's[58] observation to the same effect.

Intrathecal Therapy.—The explanation of the good effect of intrathecal therapy has provoked much discussion. Thus Marinesco's original idea was that the injection of arsenobenzol provoked antibody production in the serum. Dercum[59] holds that any benefit which accrues must result from the incidental spinal drainage with reduction of intrathecal pressure, permitting the medicament in the general circulation to enter the nervous system. For this reason he recommends a weekly injection of a full dose of arsenobenzol, followed almost at once by lumbar puncture and drainage away of fluid to the last possible drop. Keidel and Moore[60] review Swift's original speculations as to the good effect of intraspinal therapy, which were as follows : (1) That the patient's serum drawn off very soon after an injection of arsenobenzol and introduced into the spinal canal is spirochæticidal from its content in arsenobenzol ; (2) That it may contain antibodies ; (3) That normal serum may contain substances which, when brought into contact with syphilitic exudate, cause it to resolve ; (4) That the acute irritation produced by the serum may exert a beneficial effect on the chronic inflammatory process ; and (5) That the local irritation may increase the permeability of the meninges. Keidel and Moore set out to test the last of these speculations. They point out that, in normal persons, the choroid-plexus-meningeal complex holds back all substances (bacteria, immune bodies, and most drugs) except the constituents of normal cerebrospinal fluid, being thus a valuable defence mechanism. Under pathological conditions the defence is broken down, and, under exceptional conditions, the complex may allow medicaments to pass in sufficient concentration to cure. Benedict, Sicard and Block, Kopke, and others found small amounts of arsenic in the cerebrospinal fluid of neurosyphilitics after intravenous injections of arsenobenzol. The authors recall in this connection the work of Flexner and Amoss,[61] who showed that, in monkeys infected with poliomyelitis, no immune substances injected into the blood-stream appeared in the cerebrospinal fluid unless previously an aseptic meningitis had been set up by an intrathecal injection of normal horse serum. Similarly, intravenous injection of poliomyelitis virus failed to produce poliomyelitis unless some aseptic fluid such as normal serum, saline, or Ringer's solution was first injected into the spinal canal. With other organisms this method by no means always succeeds. Keidel and Moore treated 25 cases of neurosyphilis by first injecting Byrne's mercurialized serum into the spinal canal and, within twenty-four hours, giving an intravenous injection of '606'. In most of the cases purely intravenous treatment had been tried without success. The injections were given in courses of six at weekly intervals, each course being followed by ten to twelve weeks' mercurial inunction. The results were as follows :—

6 cases of tabes gave 4 good clinical results and 1 good serological.
6 general paresis ,, 2 ,, ,, ,, ,, 1 ,, ,,
2 taboparesis ,, 0 ,, ,, ,, ,, 0 ,, ,,
3 asymptomatic ,, 1 ,, ,, ,, ,, 0 ,, ,,

Comparing their results with those obtained by other workers, they conclude they are not so good. Thus, Swift[62] in 37 cases (34 tabetic) obtained negative Wassermann reactions of the fluid (1 c.c.) in 80 per cent with only 2 subsequent relapses. Walker and Haller[63] in 48 tabes, 6 paresis, 16 cerebrospinal syphilis, and 5 meningitis, treated by the Swift-Ellis or the Ogilvie method, reported uniformly good clinical improvement and serological improvement in practically all cases. Keidel and Moore, discussing Dercum's argument that substances introduced into the spinal canal rapidly disappear into the circulation, quote the experiments of Mehrtens and West, which show that, in neurosyphilis, and other spinal-nerve diseases, phenolsulphonephthalein injected intrathecally does not appear in the urine for considerably longer than in the normal, and think it reasonable to expect that spirochæticidal serum, which is much less diffusible than phthalein, would remain still longer in contact with the meninges. They cite also the results of intrathecal injection of immune serum in poliomyelitis to show that substances introduced in this manner can reach the parenchyma of the central nervous system. They conclude that intraspinal therapy is a good form of treatment in cases of neurosyphilis which resist the ordinary routine treatment ; that its action does not depend on increased permeability of the meninges, as Dercum contends ; and that aseptic meningitis produced by intraspinal injection of irritants may prove an untoward rather than a beneficial factor. [Without holding any brief for one theory against another, one cannot escape the impression that the authors would have carried more conviction if they had compared the two forms of treatment—non-specific meningeal irritation plus intravenous injection, and intravenous plus instraspinous specific injections—side by side in their own service, and if they had used a simpler irritant than mercurialized serum. Had the results proved better than Swift's, and Walker and Haller's, the benefit might have been attributed to the specific effect of the mercurialized serum. A factor of apparent importance is that the arsenobenzol was not given for six to twenty-four hours after the lumbar puncture, when any fluid removed must have been replaced ; quite possibly in the cases injected towards the end of the twenty-four hours the cerebrospinal fluid was actually under pressure as a result of the meningeal irritation, and Dercum's conditions were not fulfilled.—L. W. H]

Fordyce[64] contests the view of Dercum that intrathecal treatment acts by virtue of the spinal drainage, and instances cases with fluid only slightly improved by drainage which were restored to a state of negative fluid by intrathecal medication. The indication for intrathecal treatment is failure to respond to intravenous injections, or intolerance of this form of treatment. Intrathecal treatment may not cure deep-seated encephalitis or degenerative tabes, but must not be condemned for that reason, in view of its value in meningitis, meningo-encephalitis, and meningomyelitis. The intervals between intravenous injections should not be less than a week, and between intrathecal not less than two weeks, for the first three or four injections, with longer intervals later ; after six to eight treatments an interval of two or three months should elapse. The Swift-Ellis method (serum drawn off within fifteen minutes after an intravenous injection of '606' and not reinforced) is better than the Ogilvie (reinforced serum), since $\frac{1}{4}$ mgrm. of '606' may cause irritative symptoms, and serum reinforced with smaller amounts of '606' gives no better results than Swift-Ellis serum. He quotes a number of cases in which the purely intravenous method failed, but the intrathecal succeeded in clearing up the symptoms and restoring the fluid to normal.

Sicard[65] is unconvinced of the value of intrathecal therapy, and in this view Milian agrees, though neither he nor Ravaut favours Sicard's own method of giving frequently repeated small doses.

Paulian[66] has obtained good results from intrathecal medication, even in tabes and paresis. He claims for Marinesco the credit of first having introduced the method in 1910. He attributes the good effects he has observed to the antibodies in the serum as a result of the injection of neosalvarsan, and not to the arsenobenzol itself ; this he calculates to be so infinitesimal in quantity as to have no effect. Since the antibody is greater after twenty-four hours than a shorter time, he recommends that the blood (40 c.c.) be drawn off the day after the injection. The serum is recovered after twenty-four hours, heated to 56° for an hour, and 10 c.c. injected. The injections are repeated every eight days to the number of six or eight.

Ravaut, Arbeit, and Rabeau[67] record good results from the intraspinal injection of hypertonic solution of neosalvarsan mixed with the patient's own fluid. The dose of 4 to 6 mgrm. dissolved in as many drops of water was mixed with the cerebrospinal fluid and reinjected into the spinal canal an hour after an intravenous injection of neosalvarsan and an intramuscular injection of mercury. The treatment was repeated every eight to fifteen days, and six to ten injections were given. In 4 cases of general paresis there was some modification of symptoms, and no case was aggravated. One case of tabes did well, and in 2 cases of meningitis the improvement dated from the commencement of intraspinal treatment.

Moore,[68] comparing the results of modern treatment with those of pre-salvarsan days, thinks less than 1 per cent of well-treated cases now develop neurosyphilis. as contrasted with 5 per cent of well-treated and 25 per cent of badly-treated cases under the purely mercurial régime (Mattauschek and Pilez's figures). In order to test the effect of treatment, the author has examined the cerebrospinal fluid of 642 patients after receiving at least one course of six doses of '606' followed by several weeks of mercury by inunction (generally about six months after admission). The results below compare with the 30 to 50 per cent of cases in which the fluid is found by different workers to be abnormal before treatment. In the table below, positive means a positive Wassermann and other tests. Doubtful means a doubtful Wassermann reaction with a large amount of fluid; slight pleocytosis; and slight change in the gold curve. Negative means all tests definitely negative except for very slight globulin, which Moore thinks can be found in small quantities in normal fluids.

Variety of syphilis diagnosed	Total cases	Cerebrospinal fluid			Percentage abnormal
		Positive	Doubtful	Negative	
Primary	34	1	—	33	2·9
Secondary, early	130	15	3	112	13·8
Secondary, recurrent	20	3	—	17	15·0
Secondary, late	7	1	—	6	14·2
Tertiary, skin and mucous membrane lesions	47	4	2	41	12·7
Tertiary, bone lesions	45	3	3	39	13·3
Tertiary, cardiovascular	47	6	—	41	12·7
Tertiary, visceral	21	3	1	17	19·0
Congenital, late	21	1	1	19	9·5
Wassermann, early	35	4	1	30	14·2
Wassermann, late	155	18	8	129	16·7
Latent, early	25	—	1	24	4·0
Latent, late	55	1	2	52	5·6
Total	642	60	22	560	12·7

Analysis of the results by races showed that 15·9 per cent of 377 white patients had abnormal fluid, and 8·3 per cent of 265 coloured patients. In many cases there were minor clinical signs of neurosyphilis, as shown below:—

Reasons for puncture	Total cases	Cerebrospinal fluid			Percentage abnormal
		Positive	Doubtful	Negative	
1. Persistently positive blood Wassermann	52	12	2	38	26·9
2. Minor pupillary abnormalities . .	54	9	4	41	24·1
3. Symptoms: headache, lassitude, rheumatism, nervousness . .	67	19	3	45	32·7
Total of Groups 1–3 . .	173	40	9	124	28·3
4. Routine only (no other signs) . .	469	20	13	436	7·03

It is interesting that, if the cases showing minor signs are excluded, the balance (469 cases) with no other signs of persisting disease had abnormal fluid in 7·03 per cent. The reconciliation of the comparatively high percentages of abnormal fluid found in the above cases with the author's impression, mentioned above, that less than 1 per cent of well-treated cases now develop neurosyphilis, lies in the fact that, at the time of the tests, the patients were not what could be described as well treated. In other words, six doses of '606' followed by mercurial inunctions for about six months, though it reduces the proportion of abnormal fluids to less than half its former figure, is not adequate treatment.

The author emphasizes the great importance of controlling treatment by fluid examinations.

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SYPHILIS, CARDIAC.

Carey F. Coombs, M.D., F.R.C.P.

DIAGNOSIS.—From an interesting study of cases in Bard's clinic in Geneva, Goynaroff[1] is constrained to utter a warning against unreserved acceptance of a positive Wassermann reaction as evidence of the syphilitic nature of lesions of the aorta. Atheromatous patches, such as are so often seen in the senile aorta, are, he maintains, quite capable of creating such antibodies as will of themselves make the result of the test positive. The patient's history, the form of the clinical picture, and the presence or absence of syphilitic lesions in other viscera, are at least as valuable as the complement-fixation test.

Stolkind[2] has made a thorough inquiry into the truthfulness of the statement that syphilitic aortitis sometimes causes fever. He has studied the temperature charts of a large number of cases of cardio-aortic syphilis without finding any case in which fever was present without cause other than the syphilitic lesion. In those cases in which fever has been recorded as a symptom of such lesions he thinks, after perusing the reports, that without doubt the patient has also had some other disease (such as pulmonary tuberculosis) to which the fever was due. [It is worth remembering, too, that a streptococcal infection of the aortic valves engrafted upon a pre-existing aortic syphilis may give rise to fever in a case already presenting all the clinical features typical of aortic syphilis.—C. F. C.]

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SYPHILIS, CONGENITAL.

Frederick Langmead, M.D., F.R.C.P.

The incidence of congenital syphilis differs widely according to divers writers, syphilis being held to account for as many as 80 per cent of deaths occurring during the first year by one author, while the majority of practitioners contend that congenital syphilis is found in a very small proportion of their patients of this age or later. S. M. Ross and A. F. Wright[1] have conducted an investigation with a view to determining the incidence among the newly-born in a mining and industrial town in the Midlands. Blood was taken from the placental end of the umbilical cord immediately after it was severed in 300 unselected cases, and was tested independently by each observer, one using the technique of Prof. H. R. Dean and the other that of Col. L. W. Harrison. In 284 the results of both workers were identical, 10 cases being definitely positive (3·5 per cent). A similar investigation in another industrial town was conducted with only 40 cases, and of these only one was found to be positive (2·5 per cent).

DIAGNOSIS AND TREATMENT.—At a recent discussion at the Royal Society of Medicine, Sir Humphry Rolleston[2] considered :—

1. *The Limits of the Wassermann Reaction.* — He recalled the work of McIntosh and Fildes, who have pointed out that a positive reaction at birth does not certainly imply the presence of syphilis, since the reacting substance may have been obtained from the mother. Later, a positive reaction indicates the presence of living spirochætes and the need for treatment. The converse, however, does not hold good, for the exceptions are both numerous and real. A Wassermann reaction may be negative for some weeks and then become positive. Again, the reaction tends to become negative about puberty despite the presence of infection. Provocative injections of neosalvarsan are appealed to, but the value of a positive reaction which may follow is doubtful, since according to Strickler, Musson, and Sidlick, intravenous injections of salvarsan into non-syphilitic patients with a previously negative Wassermann reaction are followed in more than half the cases by a positive reaction. There are also cases with the stigmata of congenital syphilis and a negative Wassermann reaction, in which dystrophies and other lesions are cured by antisyphilitic treatment. At the present time it is impossible to accept as absolute the proposition that in the presence of syphilitic stigmata a negative blood-Wassermann eliminates the possibility of existing syphilitic infection. In the absence of a positive blood-Wassermann reaction, stigmata of congenital syphilis should point to the advisability of antisyphilitic treatment in dystrophies which may be due to the effects of syphilis, but may equally be a legacy from the influence of other infections, on the pituitary, thyroid, testes, or other endocrine glands. When both stigmata are absent and the Wassermann is negative, even after a provocative dose, it is questionable whether syphilis can always be so entirely ruled out that antiluetic treatment is as unnecessary as it might appear to be illogical.

2. *The Importance of Congenital Syphilis as a Predisposing Factor to other Infections.*—This should be borne in mind, for otherwise the exciting cause—e.g., a streptococcic or pneumococcic infection—by overshadowing the pre-existing syphilis may alone be recognized. Syphilis, too, by reducing resistance,

paves the way to secondary infection of a chronic character, and so renders the treatment of the resulting disease more complex.

3. *Influence of Syphilis in leading to Lesions of the Endocrine Glands, and so indirectly to Syndromes which are not necessarily Specific.*—He said that opinion as to the importance of endocrine infections in the malnutrition, infantilism, and senilism seen in congenital syphilis is gaining ground. In most instances several of the ductless glands are probably affected, the adrenals, pituitary, and testes being those most often structurally damaged. Though Addison's disease is rarely thus caused, no doubt minor degrees of adrenal insufficiency—want of vigour and muscular power, low blood-pressure, and some pigmentation of skin—would be noted not uncommonly if specially looked for. The pituitary appears to be invaded in congenital more often than in acquired syphilis. The testes in congenital syphilis had been investigated by Sir Frederick Mott, who suggests that not only may they be invaded by the spironeme, but that chronic intoxication by the disease may depress their vital energy. Infantilism, common in congenital syphilis, might be associated with juvenile general paralysis, and is correlated with the disappearance of the interstitial cells of the testes. Though the thyroid is less often attacked than the pituitary, slight degrees of insufficiency are not uncommon, and a few instances of exophthalmic goitre also have been ascribed to the disease. The occurrence of diabetes insipidus as the result of syphilis is well known, and its improvement after antisyphilitic treatment has been recorded. It would be interesting to know what proportion of cases of pluriglandular insufficiency causing diabetes insipidus and infantilism are due to congenital syphilis.

4. *The Influence of Congenital Syphilis in relation to Various Diseases, not generally regarded as due to Syphilis and not obviously due to Lesions of the Endocrine Glands.*—He spoke of chronic interstitial nephritis in early life, and thought that it is possible that in some instances of renal infantilism with bony changes, syphilis may have been the starting-point of the renal and bone lesions, mainly from its effects on the thyroid, parathyroid, and pituitary, and of the infantilism, partly at any rate, by changes in the interstitial cells of the testes. Portal cirrhosis in young children is due to various causes, but there are certainly cases of children with stigmata of congenital syphilis whose livers show ordinary portal cirrhosis, and in these the view may be taken that the diffuse intercellular cirrhosis has disappeared, but left behind some vulnerability of the liver, so that factors causing cirrhosis will readily produce this effect. Chronic peritonitis in the form of pericolitis with adhesions, and peri-enteritis causing chronic abdominal symptoms, according to Castex and Dell Valle, are a late result of congenital syphilis, and respond to antisyphilitic treatment. Of anæmia, syphilis is a potent cause in early life, but should be regarded as one only of the factors and not as an exclusive cause of any one form. Other conditions questionably associated with the disease are mitral stenosis, rickets, and congenital malformations.

H. Morley Fletcher[3] believes that congenital syphilis in London has undergone considerable modification during the last 25 years and is less severe than formerly. He does not think that the *association between syphilis and tuberculosis*, the two commonest chronic infections in childhood, is sufficiently recognized. Lymphadenitis is the form of tuberculosis he has seen most frequently in syphilitic children, most commonly affecting the cervical glands. The glands presented the characteristic appearance of tuberculosis, and the syphilitic stigmata had previously been overlooked, but antisyphilitic treatment produced very marked improvement. In two cases in children there were enlarged glands and Bazin's disease, the Wassermann reaction was positive in both, and antisyphilitic treatment brought about obvious improvement in the tuberculous glands and in the eruption, which had hitherto proved intractable to treatment. In tuberculous cases in which the family history is suggestive or stigmata are present, the Wassermann test should be done. Treatment of the syphilis may cause much more rapid improvement of the tuberculous lesion than is possible without it.

Turning to the morbid changes found in the congenital syphilitic kidney, he summarizes them as follows :—

1. *In the Fœtus—Stillborn at term and Abortions.*—Evidence of arrested development. Groups of cells of embryonal type surrounded by normally developed tissue, and a varying degree of small-cell infiltration of the cortex.

2. *In Infants.*—Similar changes may be present, but sclerosis may have begun.

3. *In other Children.*—Sclerosis is more diffuse and the capsule is adherent ; the weight of the kidneys is generally unequal and is diminished.

Rose Bradford and others have suggested that cases of unexplained nephritis may be due to syphilis as a predisposing cause. If this be true, the influence of the syphilis may be explained by the supposition that the spirochætes, although they have died out, have left behind a damaged and susceptible organ. A mild attack of a specific fever in a child known to be syphilitic may be followed by acute nephritis. Hutinel has drawn attention to the vulnerability of the kidney in congenital syphilis, and to the liability to relapse of those cases of nephritis. Syphilis may also be a factor in some of the cases of intermittent albuminuria of childhood.

D. Nabarro[4] gives his experiences for the year 1920, during which he saw 68 new cases with a positive Wassermann reaction and treated 77 patients with 530 injections. He used **Novarsenobillon** and later **Neokharsivan**, with no ill effects in either case except rarely a little vomiting immediately after the injection ; this occurred rather more often after the neokharsivan than after the novarsenobillon. Intravenous injections into the arm or external jugular vein were given whenever possible ; otherwise the injections were intramuscular. For infants under one year the initial dose was 0·05 grm., increasing to 0·1 or 0·15 grm. For older children the initial dose was 0·1 or 0·15 grm., increasing to 0·3 or 0·45 grm. A course consisted in six weekly injections and simultaneous inunction with **Mercury.** At the end of the course, **Iodide** was given for three weeks and the Wassermann test then done. If necessary the course was repeated once, twice, or even more often. Several of the patients had 18 to 24 injections, and one boy had over 10 grm. of galyl and novarsenobillon in 28 injections, without ill effects, but without modifying the strongly-positive reaction of the blood. Nabarro has great faith in the Wassermann reaction when properly done, but in view of negative reactions in very young syphilitic children, always examined the blood of the mothers also, in cases of infants under one year old. Very rarely was the mother's blood negative when the child's was positive. As a result of the combined treatment many of the patients were much benefited, but he is unable to say yet that they are cured. Many of the young infants, developing a rash at four, five, or six weeks, died in spite of treatment. His experience is that in congenital syphilis a positive reaction cannot easily be made negative. Out of 62 cases the reaction had, at some time or other, become negative in only 14, and in 5 of these it had since become positive again. To him it is obvious that attempts should be made to treat the child before it is born by treating the mother, since it has been abundantly proved that a syphilitic mother can thereby be delivered of a healthy child.

Leonard Findlay[5] is a firm believer in the value of the Wassermann reaction and from an analysis of 1000 reactions performed for him by R. M. Buchanan deduces that statistically a positive reaction denotes syphilis, a negative reaction no syphilis, at least in the presence of active manifestations of disease. Treatment by mercury alone is most unsatisfactory, because many of the youngest patients die—in his own experience 70 per cent of those under three months of age. Combined treatment with **Arsenobenzol** preparations and **Mercury** has reduced this mortality to 20 to 30 per cent; but unfortunately. as judged by the blood-reaction, cure is only obtainable in a proportion. In children under one year, 8 per cent could not be cured by as many as 14 injections, and in children over one year a cure could not be obtained in 50 per cent. This contrasts very unfavourably with the results of antenatal treatment, by means of which he has obtained 100 per cent of successes.

J. E. R. McDonagh's[6] view is that if a woman contracts syphilis before the fifth month of pregnancy, the child always becomes infected; if during the sixth and seventh months, the child is affected in about half of the cases; and if during the eighth and ninth months, the child escapes. Though a syphilitic mother who has been treated throughout pregnancy may be expected to give birth to an apparently healthy child, he thinks that the majority of these are really syphilitic, and at the age of four or more develop symptoms irresponsive to treatment. Consequently he always treats for two or three years every child born of a syphilitic mother, however healthy it appears to be at birth. It is the rule for children born of treated syphilitic mothers to be serologically negative and to remain so until clinical symptoms appear, even if they are deferred for years; therefore a negative reaction cannot be held to signify that a child is not syphilitic. If the test is positive during the first months, treatment only very slowly renders it negative, and without treatment it tends to become negative about puberty. When the test becomes positive for the first time three or four years after birth, it remains so for the rest of the patient's life irrespective of the amount of treatment. A positive reaction given by a child at or soon after birth is no proof that the child is syphilitic. He anticipates less early congenital syphilis but more syphilis hereditaria tarda, and asserts that pathological tests neither help in prognosis nor indicate whether a case is cured.

R. C. Jewesbury[7] has reported on the first year's work of a clinic for syphilitic children. A total of 145 children of syphilitic mothers were seen. In about 50 per cent the disease was most marked in the earlier pregnancies, and appeared to become attenuated, apparently healthy children coming at the end of the family; but in just as many cases children free from infection cropped up irregularly in the midst of definitely syphilitic children. A few children of syphilitic mothers who had received no treatment were free from signs and had given negative Wassermann reactions even up to the ages of ten or fourteen. Many children showed the usual signs. In 10 per cent symptoms developed first after the fifth or sixth year in the forms of periostitis, synovitis, interstitial keratitis, brain disorders—particularly mental disturbance—deafness, and syphilitic teeth. The Wassermann reaction had proved a reliable test, but was often negative during the first few months, later to become positive. To estimate the effect on the child of untreated syphilis in the mother, 77 families (322 pregnancies) were investigated. Of these pregnancies, 30·2 per cent resulted in miscarriage or still-birth, 22·8 per cent in death in infancy or early childhood, whilst 47·0 per cent represented children still alive. The mortality was 32·4 per cent. When the mother was treated before or during pregnancy, 39 could be considered to have been effectively treated before or during the earlier stages of gestation. There were 53 pregnancies; of these, 1 resulted in miscarriage, 6 in death in infancy, 46 in living children.

There were 87 per cent of surviving children. The mortality was 11·5, as against 32·4 of the former series. When the treatment was not begun until the seventh month or later, the child was usually evidently syphilitic; but with treatment not later than the fifth month of pregnancy, the children were born apparently healthy and gave a negative Wassermann reaction. In most cases the children affected were treated by **Novarsenobillon** intramuscularly into the buttock, the dose being 0·015 grm. per kilo. of body-weight, with gradually increasing doses at intervals of one week for six injections. In some cases a second course was given three months later. Simultaneously, **Hyd. c. Cret.** ($\frac{1}{2}$ to 1 gr. t.d.s.) was administered regularly. In severe cases **Mercurial Inunction** was used. In 30 cases receiving a full course the Wassermann reaction had changed from positive to negative. In some a strongly-positive reaction had been reduced. In others the reaction was unaffected, the cases benefiting least, as judged by reaction and physical signs, being those of syphilis developing in children from five to ten years old, and especially with involvement of the central nervous system.

Lyle B. Kingery[8] has studied the *spinal fluid* in 52 cases. Of these, 15 (28·8 per cent) showed some deviation from the normal. In 4 the changes were slight—a positive Wassermann reaction in 3, and some increase in cells, together with a corresponding increase of solids. In 11 the changes were more considerable—a strongly-positive Wassermann reaction running parallel with albumin and globulin increase. There was, however, a lack of correspondence between the cell-increase and other findings. In the second group of cases, with few exceptions, the clinical symptoms were severe. He urges the employment of **Lumbar Puncture** in cases of congenital syphilis for diagnosis and for prognosis.

References.—[1]*Lancet*, 1921, i, 321; [2]*Ibid.* 471; [3]*Ibid.* 630; [4]*Ibid.* 484; [5]*Ibid.* 695; [6]*Ibid.* 696; [7]*Ibid.* 962; [8]*Jour. Amer. Med. Assoc.* 1921, Jan. 1, 12.

TABES DORSALIS. (*See also* Static or Posture System, Hypertonus in Dementia Paralytica.)

J. Ramsay Hunt, M.D.

Familial tabes dorsalis is described by Fleming Burrow.[1] That heredity is an important factor in the incidence of nervous disease cannot be gainsaid. In concentrating upon the study of parasitic organisms as disease-producing agents, we are apt to thrust into the background the obscure factors of tissue-peculiarity, 'sensitiveness', and selective action, or, in other words, the state of the soil in which the seeds of disease are sown. Neurology has always recognized the potent influences of family tendency and selective action in the causation of chemical and microbic lesions in the various highly specialized units of the nervous system. 'Sensitiveness', tissue-affinity, and cell defence are almost incalculable factors in disease.

Of six surviving members in a family of eight, born of healthy parents, four have acquired undoubted syphilis from various different sources, with a resulting tabes dorsalis in all. A fifth member of the family acquired gonorrhœa (syphilitic infection being doubtful) and probably has early tabes dorsalis. A sixth escaped venereal infection and remains healthy. It is suggested, from the above facts, that tabes dorsalis cannot be attributed to a special strain of spirochæte introduced at the initial infection, but is more likely to be due to the spirochæte acting upon tissues specially sensitized, either by natural family peculiarity or by certain methods of treatment. The discovery of the spirochæte in the tissues (brain and cord) of general paralytics and tabetics should stimulate further research into the other, still unknown, factors which are concerned in the production of these diseases.

Reference.—[1]*Jour. Neurol. and Psychopathol.* 1920, Nov., 446.

TESTICLE AND EPIDIDYMIS, SURGERY OF.

Sir John Thomson Walker, F.R.C.S.

Ectopia Testis.—Brenner[1] recommended replacement of the inguinal testicle in the abdomen. In the preperitoneal method of replacement, the testicle is placed between the peritoneum and the posterior sheath of the rectus after ligature and removal of the sac. In the intraperitoneal it is either forced through the open processus vaginalis or through a peritoneal slit in the abdominal cavity. The advantages of intra-abdominal replacement are simplicity, complete closure of the canal, no tension on the testicle, the testicle does not atrophy so easily, and the symptoms disappear. The chief objection is the possibility of the development of malignant growth, but this has probably been over-estimated. Difficulty in diagnosis from appendicitis may be encountered where epididymitis of a ruptured testicle occurs. After orchidopexy a really good result was obtained in only 12 per cent, and a satisfactory result in 32 per cent. Abdominal replacement gave a perfect result in 78 per cent, and the intraperitoneal method appeared to give a better result than the preperitoneal.

Michon and Porte[2] describe an investigation into the histology of 6 cases of ectopic testicle. In cases of supposed spermatogenesis, large diameter of the spermatic tubules and diminution of the intertubular fat were noted. In the case of the older patients the lobulation was more definite, and the intratubular fat was abundant. Increase in size with age was probably due to thickening of the tunica propria and increase of the interstitial cells.

Pannett[3] contributes a paper on the treatment of the imperfectly descended testicle, and draws the following conclusions: (1) Where orchidopexy is impossible, orchidocœlioplastomy should be performed rather than removal: (2) That in order to avoid destroying the possible spermatogenetic function of an arrested testicle which might descend later on, operation on uncomplicated cases should be postponed until the 8th or 12th year; (3) That a bubonocele is no indication for operation; (4) That indications for operation are attacks of strangulation, torsion, or pain (orchitis from muscular trauma). Turner, in discussing the paper, recommended bringing the testicle down to the opposite side of the scrotum through the median septum. No sutures were required, for the septum contracted and exerted slight traction on the testicle.

Sarcoma Testis.—Kaiser[4] describes a case of bilateral sarcoma of the testicle. There was no previous history of venereal disease or trauma, and the onset of the testicular enlargement was sudden. Histologically the tumours showed the structure of round-celled sarcoma. There was rapid recurrence in the scrotum and metastatic deposit in the frontal bone. These deposits disappeared under *x*-ray treatment. The literature is reviewed.

Spermatocele.—Crossan[5] relates a case of spermatocele, and discusses the origin and diagnosis of the condition. Spermatocele most frequently arises from the vasa efferentia and vas aberrans superior, often from the sessile hydatid, and only occasionally from the vas deferens and organ of Giraldès. Trauma is the most probable cause. Removal by operation is the only method of treatment. In the cysts arising from the sessile hydatid and the vasa efferentia, a portion of the tunica albuginea must be removed, and the defects covered with serous membrane. In the other varieties the cyst can easily be enucleated. If the testicle is atrophied, castration is the logical procedure.

Hydrocele.—Chatterji[6] has introduced an operation for hydrocele by plication and overlapping of the tunica vaginalis. The hydrocele is exposed by a scrotal incision and the sac freely opened longitudinally. The parietal and visceral layers are rubbed with dry gauze or scraped with a spoon. One-half of the sac is drawn across the testicle and fixed by a few sutures to the line of reflexion of tunica vaginalis from the testicle. The other half is drawn over the surface of the flap and similarly sutured. If the sac is redundant it is plicated at the upper and lower ends. In very large hydroceles, portions of the sac are removed, and in thick sacs the fibrous tissue is removed by scissors or dissection. The scrotal wound is closed. The advantages are that the testicle still retains a sac, there is absence of the oozing usual after an excision, and there is no large mass such as is produced by folding back the everted sac. A table of 225 successful cases is given.

Varicocele.—An undesirable sequel to the operation for varicocele is the column of induration that frequently forms from the testicle to the external ring and which may persist for several weeks. Skillern[7] states that the causes of this induration are: (1) Limited excision of veins with end-to-end suture; (2) Failure to obliterate the dead spaces made on dissection; (3) Irritation of the vas deferens from rough manipulation. The author avoids these disadvantages by removing the entire length of the veins from external ring to testicle. The stumps are not united, but if it is desired to draw the testicle up, the cremaster muscle is sutured transversely. He does not shorten the scrotum by resection. After the operation a suspensory bandage is applied and the scrotum elevated. The patient is allowed up in two days and is discharged in six.

Douglas[8] discusses the results of operation, by different surgeons, for varicocele in 303 patients. The high operation was performed in almost all cases. Of 106 cases followed up, 35 per cent had hydrocele of severe degree, and 4 per cent had atrophy of the testicle. Of 78 cases examined, only 48 per cent were normal. The hydrocele may be small and flaccid or large and tense, and in the latter case the patient is worse than before the operation. Bloodgood urges against the performance of operation, and states that the varicocele disappears at the age of 25. In the cases reported by Douglas, the age in thirty-three was between 25 and 30, in eight between 30 and 35, in five between 35 and 40, and in three over 40. The rest were under 25. The operation should be strictly limited to varicocele of unusually large size and causing distinct symptoms in a patient who is not of the ordinary neurasthenic type. The author believes that removal of the tunica vaginalis at the time of the operation for varicocele would add to the danger of atrophy of the testicle. The frequency of hydrocele as a complication of the operation should be explained to the patient. Every care should be taken to avoid trauma to the veins of the cord and to prevent hæmaturia and even slight infection.

Tuberculous Epididymitis.—Wildbolz[9] states that tuberculous epididymitis is bilateral in from 50 to 75 per cent of cases, and this is reduced to 30 per cent by unilateral **Castration.** Bilateral castration in bilateral involvement results in a cure in 80 per cent, clearing up also tubercle of the prostate and seminal vesicles. When used to avoid castration in youth, conservative measures such as Bier's hyperæmia, local application of iodine or naphtha, salt baths, and sulphur baths are as unsatisfactory as tuberculin. Spontaneous cure practically never occurs. Rollier reported 7 out of 9 cases cured and 2 improved by heliotherapy. Wildbolz examined histologically 13 cases of tuberculous epididymitis which had been under treatment by heliotherapy for eight months to seven years, and found that in the majority there was not a trace of healing. Marked fibrosis was present in only 3 cases. Rollier recommends **Heliotheropy** combined with **Cauterization** as recommended by Velpean in 1851, and with *x*-ray therapy.

Wildbolz prefers **Epididymectomy.** Of 88 patients on whom he performed 72 epididymectomies, 3 died of meningitis several months after the operation.

Epididymectomy has the same beneficial effect on tubercle of the seminal vesicles and prostate as has castration. In 15 per cent of the cases the second epididymis became affected later. Involvement of the testicle contra-indicates epididymectomy.

In the diagnosis of doubtful cases the author employs his intracutaneous 'own urine' test. For the after-treatment, injection of **Tuberculin** and **Heliotherapy** are advocated. If the vas is not involved, Henschen sutures the stump into the testicle.

Acute Epididymitis.—Cathcart[10] discusses a case in which epididymitis followed a violent muscular strain, and this again was followed by tuberculous infection. In all, he quoted 14 cases to support his contention that injury from strain, where the necessary conditions have been present, will produce acute orchitis or epididymitis. The method of production might be rupture of the vas or torsion of the testicle, probably the latter. A latent focus of tubercle might be stimulated into activity, or a nidus might be formed for a fresh invasion.

Vivian[11] regards operation as the best and quickest method of treatment for acute epididymitis. The tunica is exposed by a scrotal incision. The sac is opened and turned back, and sutured loosely behind the cord with catgut. A few very superficial incisions are made in the epididymis with a scalpel, and through one of these a blunt probe is introduced, pushing aside the tubules but not perforating them. Small collections of pus are frequently evacuated from pockets between the tubules. A drain of folded rubber tissue is now introduced into the epididymis. The relief from pain in acute cases is immediate. The temperature falls to normal in twenty-four to thirty-six hours. The tube is removed on the fourth day, and by this time the epididymis is much reduced in size.

References.—[1] *Wien. klin. Woch.* 1920, Dec. 2, 1062 ; [2] *Lyon chir.* 1920, Nov.–Dec., 731 ; [3] *Lancet*, 1921, i, 1241 ; [4] *Wien. klin. Woch.* 1920, Dec. 2, 1062 ; [5] *Ann. of Surg.* 1920, Oct., 500 ; [6] *Ind. Med. Gaz.* 1921, June, 209 ; [7] *Ann. of Surg.* 1920, Oct., 508 ; [8] *Jour. Amer. Med. Assoc.* 1921, March 12, 716 ; [9] *Surg. Gynecol. and Obst.* 1921, Feb., 152 ; [10] *Med. Press*, 1921, Feb. 2, 91 ; [11] *Ann. of Surg.* 1921, March, 357.

TETANUS.

Sir W. I. de C. Wheeler, F.R.C.S.I.

Denyer[1] describes a case of delayed tetanus treated with large doses of **Antitetanic Serum.** Intrathecal injections were given under chloroform, an equal quantity of cerebrospinal fluid having been drawn off previously. This method acts on the nerve-cells in a shorter time than the intramuscular injection. He found difficulty in obtaining highly concentrated serum, and

Date in 1917	Intra-thecal	Intra-muscular	Subcut-aneous	Date in 1917	Intra-thecal	Intra-muscular	Subcut-aneous
Ap. 28	30	15	—	May 9	—	160	—
29	—	15	—	10	—	160	—
30	30	15	—	11	—	80	—
May 1	160	15	—	12	—	80	—
2	—	80	15	13	—	30	—
3	160	160	80	14	—	30	—
4	160	80	—	15	—	80	—
5	—	80	30	16	—	80	—
6	160	80	30				
7	—	80	80	17*	—	—	—
8	—	80	—	18	—	30	—

* No serum administered on this day.

Total of units given, 2365 hundreds, or 236,500 units.

the more dilute is not nearly so efficient for intrathecal injection, as only a small quantity can be injected into the spinal theca. The total number of units given was 236,500. The above table shows the dosage at each injection. The numbers represent hundreds of units. The patient made an excellent recovery, and was seen in robust health three years after the attack of tetanus.

Freedlander[2] emphasizes the treatment of tetanus by large amounts of antitoxin intravenously. His method is as follows: (1) Antitoxin is given in dosages of 10,000 to 20,000 units, intravenously, several times daily until all spasm is gone; (2) Morphine hypodermically and chloretone by rectum are given every four to six hours during the stage of reflex hyperexcitability; (3) Liquid nourishment and large amounts of water are given every two hours. A syringe outfit with a small needle can be inserted into the vein, and the antitoxin, together with a small amount of saline, injected under pressure. It is pointed out in this paper that tetanus toxin has marked affinity for nerve tissue, while the peripheral motor nerves have been proved to be the pathways by which it is conducted to the central nervous system. There has been some controversy as to whether the axis cylinders, or lymphatics in connection with the nerve, or the nerve-sheaths, carry the toxin. The results of vigorous antitoxin therapy seem rather to prove that the toxin is carried by the lymphatics, and the latest experimental evidence substantiates his assumption. Freedlander maintains that as a basis for therapy it will be safest to take the position that Robertson assumes, namely, that tetanus toxin appears in the blood-stream and other tissues, and can be neutralized by antitoxin at any stage in its passage until it reaches the ganglionic nerve-cells, with which the toxin is indissociable. The author, however, does not point out the anaphylactic danger of giving the serum by the intravenous route.

Cummins[3] discusses tetanus in the British Army during the European War, and comes to the following conclusions:—

1. The almost universal use of antitoxin for prophylactic inoculation has greatly diminished the incidence of tetanus as a complication of war wounds.
2. There is reason to hope that, by following up and applying the new knowledge gained by Dr. Tulloch as to types of tetanus bacilli, it may be possible still further to increase the prophylactic efficacy of antitetanic serum in the future.
3. The prophylactic use of antitoxin has not only reduced the incidence of tetanus, but has also led to a modification of the clinical type of the disease. Tetanus, in inoculated persons, tends to assume a milder form, characterized by a longer incubation period and a greatly decreased case mortality. 'Local tetanus', without trismus, is common.
4. The improvement in surgical technique, notably the introduction of early excision of wounds, has favourably influenced the incidence, the severity, and the mortality in tetanus cases.
5. There is as yet no statistical evidence to show that antitoxin has been valuable in the treatment of tetanus.
6. Good results from serum therapy have been claimed by many surgeons, and recent experiments on animals show clearly that under controlled conditions serum therapy can cure tetanus even though administration had been withheld until the onset of spasm. It is therefore advisable to give every tetanus patient the chance of benefit from specific treatment.
7. If serum is given it should be given in large doses and as early as possible after onset. Intrathecal injections should be given, and these should be supplemented by intramuscular and subcutaneous inoculations.

In connection with prophylaxis, it is well to remember that in about ten days the immunity conferred by the first prophylactic injection is to a great extent lost. A second injection can therefore be given at an interval of seven days, and, in a long-continued septic wound, a third or fourth is desirable. Anaphylaxis may be discounted with prophylactic doses each of 500 U.S.A. units, given subcutaneously. It takes forty-eight hours for the serum to be absorbed after subcutaneous injection. The absorption is more rapid when injected into the muscles—roughly speaking, twelve hours. In order to reach an early diagnosis the muscles round a wound should be examined, as they will be the earliest affected. Spasticity and increased reflex excitability of these muscles are early in evidence. Other early signs to be noted are general restlessness, violent headaches, outbursts of temper, stitch in the side, profuse sweats, and difficulty in micturition.

REFERENCES.—[1]*Lancet*, 1921, i, 1358; [2]*Amer. Jour. Med. Sci.* 1921, June, 819; [3]*Jour. R.A.M.C.* 1921, 322.

TETANY. (*See* LARYNGOSPASM.)

THORACIC DUCT, FISTULA OF. (*See* LYMPHATIC GLANDS IN THE NECK.)

THORACIC SURGERY. (*See also* PHRENIC NERVE, TEMPORARY BLOCKAGE OF.)

Sir W. I. de C. Wheeler, F.R.C.S.I.

METHOD OF EXPOSING THE HEART.

Constantini,[1] of Algiers, points out the difficulty of avoiding injury to the pleura in effecting satisfactorily exposure of the heart by the hitherto published methods. He has devised the following procedure with a view to the avoidance of this complication. A wide cutaneous incision hinging outward, is utilized, starting from below the 8th costal cartilage on the the left side, up past the xiphoid to one finger-breadth to the right of midsternal line. The abdomen is opened for the whole subchondral extent of the incision. The left index finger removes the xiphoid attachments of the diaphragm, and then pushing up behind the sternum works back the pleural reflections; these are loosely fixed to the triangularis muscle and are easily detached from the sternum. Having effected their detachment as high as possible, the sternum is now divided with a chisel, rather to the right of the middle line. There is a natural inclination to make it to the left, but the operator should bear in mind the better exposure to be obtained by keeping to the right. This sternal division is carried up to the second cartilage, where the chiselling is continued out to the 2nd left interspace. The soft tissues of this space are spared, thus avoiding the internal mammary vessels. The flap so formed is forcibly retracted outward either by an assistant's hand or by an automatic retractor of the Tuffier type. If the diaphragm appears to oppose efficient retraction, it is best to divide it anteroposteriorly, as recommended by Duval. The author claims the following advantages for this exposure: (1) A side exposure of the cardiac area; (2) Avoidance of injury to either pleura; (3) No necessity to make an external hinge for the flap by breaking or incising ribs or cartilages; (4) The continuity of the sternum is divided in such a manner as not to interfere with the anterior costal support when re-sutured; (6) The risk of peritonitis is minimal if the peritoneum is well walled-off with compresses.

Matas[2] describes *the Duval-Barasty operation* as follows: The operation essentially consists in:—

1. A median incision from the level of the 3rd costal cartilage to a point in the linea alba midway between the tip of the xiphoid cartilage and the umbilicus. After cutting the skin to the sternum, the incision is carried

through the abdominal aponeurosis and between the recti, down to, but *not* through, the peritoneum.

2. The upper insertions of both recti are detached from the edge of the ensiform cartilage, exactly through the median line and the posterior surface of the ensiform, the attachments of the diaphragm also being cut away from the cartilage.

3. Two fingers of the left hand are inserted and pushed from below upwards and behind the xiphoid, and then behind the sternum up to the level of the 3rd costal cartilage, the fingers closely following the posterior surface of the bone. In this way the pericardium is detached from the retrosternal connective tissue. By separating the fingers slightly, the two pleural cul-de-sacs are pushed away from the mid-line, and laterally to the under surface of the costal cartilages.

4. The sternum is then split in the mid-line with a large chisel (Matas prefers the giant sternotome of Hudson, which does better and quicker work), beginning from the tip of the xiphoid and ending on a level with the 3rd costal cartilage. At this level a transverse section of the sternum is made, leaving the manubrium attached to the clavicle and to the 1st and 2nd costal cartilages.

5. The two halves of the sternum are now spread open, lifted, and bent out with retractors (the hands of assistants are preferable), care being taken not to fracture the cartilages. Through this large vertical space the pleural cul-de-sac and pericardium are recognized, displaced, and detached from the thoracic wall with gentle gauze pressure to avoid any tearing of the pleura.

6. Laparotomy and pericardiotomy: the peritoneum is now opened in the mid-line. By inclining the incision a little to the left and immediately along the insertion of the diaphragm to the chest wall, the pleuræ will be seen to diverge, leaving a very considerable and safe interspace between them. The pericardium is now held up with two forceps and divided in the mid-line with straight, sharp, but blunt-pointed scissors; the pericardium is then split its full length to the root of the great vessels. The pleural cul-de-sacs are now safe and need not be considered.

7. Section of the diaphragm: between the pericardial and peritoneal sacs, the diaphragm still remains as a horizontal partition holding the two halves of the divided xiphoid in place. The scissors are again introduced and the diaphragm is divided up to the level of the suspensory ligament. The sternal halves are then pulled apart, and by lifting them up and bending them outward upon their cartilaginous attachments, they widely open the retrosternal space.

It is like opening a book—exhibiting the heart with the great vessels at its base, in full view before the operator. The ventricles, auricles, aorta, and vena cavæ, and the anterior and posterior surfaces of the heart, are thus made easily accessible to any manipulation without requiring exteriorization, traction, or torsion of the organ.

Pool[3] describes *pericardiotomy for suppurative pericarditis.* He thinks that suppurative pericarditis is not an excessively rare lesion; a considerable proportion of the cases occur in children. Osler has already stated that probably no other serious disease is so often overlooked by the practitioner. Infection of the pericardium is usually secondary, but although the prognosis is extremely grave, it is by no means hopeless. Pool describes in detail a case of a boy, age 9. He was suffering from double pneumonia, and was delirious. Suppurative pneumonia was suspected. On examination of the heart the apex impulse was absent. Percussion showed enlargement both to the right and to the left; there were no murmurs; a slight pericardial friction sound was heard at the base, but all sounds were very distant and muffled.

The pericardium was aspirated in the 6th space and pus obtained. A curved incision was then made from the 5th rib at the left border of the sternum to the 7th rib, curving outwards along the latter. The flap was raised outwards from the bony structures, and a segment of costal cartilages of the 6th and 7th ribs was removed. The internal mammary artery was ligated. The triangularis sterni was cut, and the pericardium exposed. This was opened

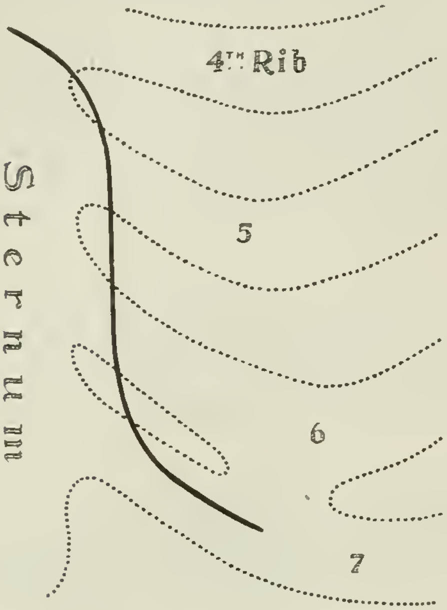


Fig. 78.—Incision for pericardiotomy.

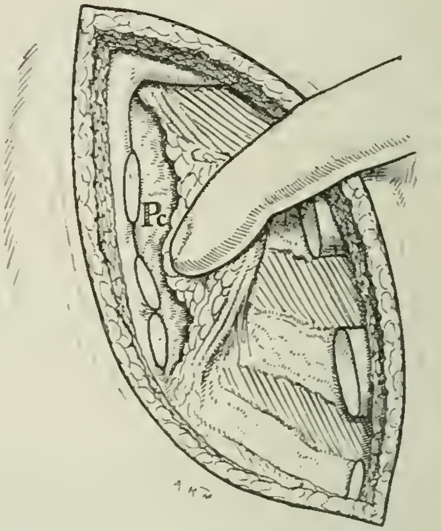


Fig. 79.—Triangularis sterni separated from sternum. Finger displacing fat and pleura outward to expose pericardium (Pc.)

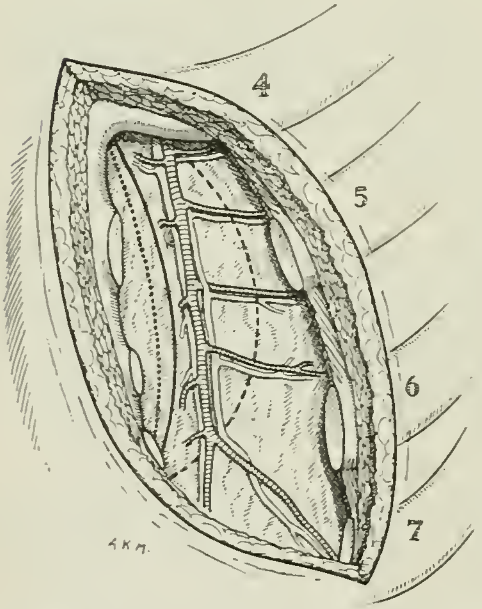


Fig. 80.—Diagrammatic: portions of the 5th, 6th, and 7th cartilages removed. Approximate relations of lung, pleura, and internal mammary vessels to line of incision in pericardium. - - - - lung; — pleura; . . . . . line of pericardial incision.

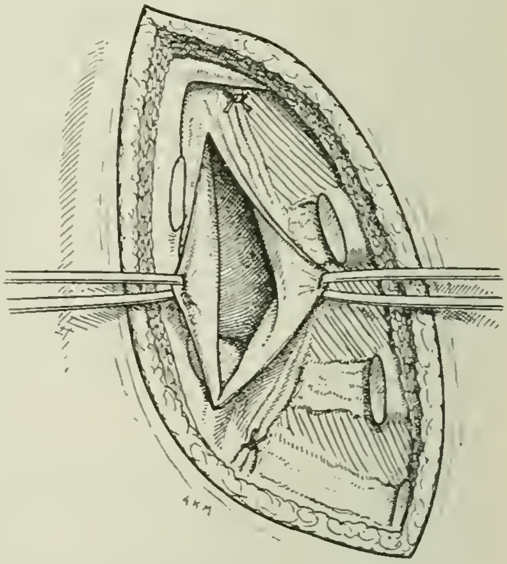


Fig. 81.—Pericardium opened, showing heart and diaphragm.

(*Figs.* 78, 79, 80, *and* 81 *re-drawn from 'Annals of Surgery'.*)

practically half an inch from the sternum. A large quantity of thick pus was allowed to escape slowly. A finger in the pericardial sac revealed the presence of a large quantity of thick fibrin, which bound the heart loosely to the parietal pericardium. A mass of this was removed with forceps; the pericardium was sutured on each side to the superficial soft parts, and a small cigarette drain introduced. Pus was also found in the right side of the chest, and an intercostal space. A pure culture of pneumococci was obtained, and ten days after the operation cultures of pus from the pericardium revealed the *Streptococcus hæmolyticus*. The boy was in normal health when seen eight months after operation. It is stated in this paper that the approach for drainage should be at the left of the sternum, and that no procedure should be employed which does not drain the lowest part of the pericardium. To do this, the operation must include resection of the 6th and 7th cartilages. The removal of one cartilage is hardly sufficient. The accompanying illustrations (*Figs*. 78, 79, 80, 81) show the operation recommended.

EMPYEMA.

In pre-war days surgeons were deeply concerned with the risk and danger of the admission of air into the pleura: the fear of pneumothorax dominated the minds of most surgeons. It soon became evident during the war that pneumothorax could be disregarded as a vital factor in the surgery of the thorax. There is no need for the cumbersome negative or positive pressure chambers introduced by Meyer, Sauerbruch, and others, since ventilation of the lung by tracheal insufflation is sufficient in the great majority of cases. The French military surgeons unhesitatingly opened the pleura whenever it was necessary for their purpose, and paid no regard to special forms of anæsthesia.

Empyema in Children.—One of the drawbacks to intrathoracic surgery is the fact that the effects of intrapleural pressure on one side are transmitted to the other side, especially in children. Hence the introduction of various forms of negative and positive pressure apparatus. The prognosis is most favourable in pneumococcus infections, and least favourable in the streptococcus type. Both smears and cultures should be made of the fluid; the infection is often mixed, and not infrequently one type of micro-organism dies and can be detected only in the smear. Nine-tenths of the cases of empyema in children are connected with or following pneumonia; one-tenth is due to acute infectious diseases. A double empyema appears more commonly in infants, and the younger the child with pneumonia, the greater the probability that empyema will be a complication. Localized empyema is common. The interlobar variety is rarer. Auscultation cannot be relied upon in the case of children; *x* rays are helpful in determining the extent of the fluid, but do not supplant the exploring needle. Moorhead has pointed out that in practically all cases of apparently unresolved pneumonia after a reasonable time has elapsed, an empyema will be found. In the streptococcic variety early drainage may cause too sudden and decided a change in the intrathoracic pressure. The aim should be to limit the extent of the open pneumothorax. Aspiration, although not curative, is used to relieve pressure and dyspnœa and to tide the patient over until adhesions have formed. Intercostal drainage following aspiration is sufficient in children. Exercises to expand the lungs should be commenced at once. The author believes that more lives would be saved, and mutilating operations for collapse of the chest would be entirely avoided, if the scheme of graduated operative treatment were employed.

Willie Meyer[1] draws attention to this point. He shows that the thorax cavity is divided by the mediastinum from spine to sternum, with a lung to the right and to the left, and in it lie the heart and the large blood-vessels which connect the heart and lungs, together with nerves and other soft tissue; in fact, the structures which are the very seat of life itself. He states that when one pleura is opened the patient makes strenuous efforts in breathing with the closed side of the lung, and sets the mediastinum in motion to the right and left like a flopping sail. He urges the use of the differential pressure methods in order to avoid the occurrence of acute pneumothorax during operation, and the immediate and complete closure of the incision in conjunction with air-tight thoracic drainage.

Notwithstanding the opinion of such an authority as Willie Meyer, the success following the removal of bullets and shrapnel from the lungs without any special negative pressure apparatus must be borne in mind. If portions of one or two ribs are removed and the pleura is opened, beyond initial distress, the patient does not as a rule resent the procedure—at all events to any alarming extent. The lung collapses and can be lifted if necessary into or through the wound, and a projectile, which is very easily located with the fingers, can be removed; the wound is closely sutured, and in a surprisingly short time the pneumothorax disappears and the lung again expands. Open ether anæsthesia is sufficient, but it must be remembered that, once the lung collapses, it becomes more difficult to keep the patient anæsthetized. Deep anæsthesia should be induced before the commencement of the operation. Gask, Moynihan, and others have drawn attention to these procedures. The former prefers to get over the difficulty of pneumothorax and collapse of the lung by intratracheal insufflation with combined anæsthesia.

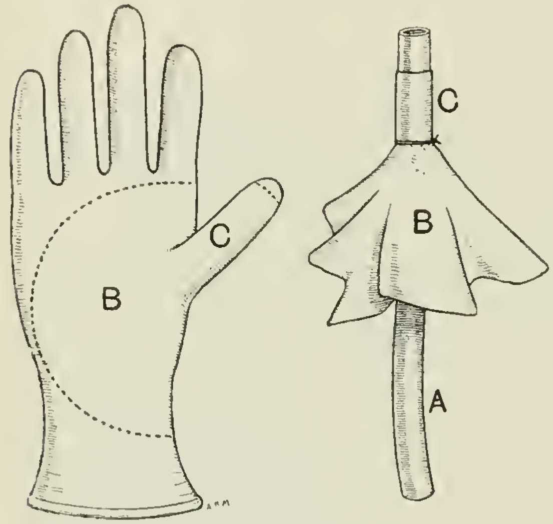


Fig. 82.—Extemporized air-tight drainage in empyema. A section of rubber is cut from a glove, as shown by the dotted lines, the section containing the thumb. A rubber drainage tube for insertion in the chest is smeared with surgical glue (mastisol) and passed through the thumb portion. Position is maintained and air-tight drainage ensured by gluing the rubber to the chest wall.

A, Intrathoracic portion of drainage tube; B, Rubber to be glued to chest wall; C, Thumb of glove surrounding tube connected with vessel on floor containing fluid. (*Wheeler.*)

In cases of acute empyema the rational treatment seems to be to aspirate, and aspirate again. In the severe forms, after one or two aspirations a rib should be excised, an air-tight junction made round the tube, and the latter should lead into a vessel containing water, so that in the early days of drainage no air can enter the thorax (*Fig.* 82). If the lung does not expand within a reasonable time, and the track of the tube remains unhealed, the chest should be re-opened, and the fibrous sheeting should be removed in order to allow the imprisoned lung to expand. For obvious reasons this procedure must not be too long delayed. Gask[5] believes that more and more operations on the chest should be undertaken, and the operation of thoracotomy would become as useful and as ordinary as laparotomy.

He discusses the improved treatment of acute empyema.[6] He thinks that the method introduced during the war of opening the chest widely and clearing out all affected material, and closure without drainage, is only on trial, and the question is *sub judice*. In general terms he thinks that the diagnosis of empyema must be made very early to expect success from this method, and in the presence of streptococci it is safer to drain than to close the chest. There should be an air-tight closure round the drainage tube where inserted into the chest, and a tube should lead to a vessel partly filled with water under the bed. He points out that localized empyema may be easily missed when pus is not present in any great quantity, or is so thick that it cannot be drawn through a needle, or when it is walled in with thick fibrous adhesions, or is interlobar in position. Pus which is missed in this way may accumulate and track until it bursts into a bronchus. But these cases arise where pus cannot be diagnosed either by the external needle or by the x rays, and if the clinical findings are suggestive, an exploratory thoracotomy should be undertaken. Gask concludes a most instructive paper as follows: It has been pointed out that during the past six hundred years surgery of the chest has at times receded and at times advanced, and that at no period has such progress been made as occurred during the last war. During that time surgeons overcame their dread of opening the closed thorax, and learnt to repair a wounded lung and restore it to its normal function. It has also been demonstrated that in civil practice it is possible, with safety to the patient and without expensive apparatus, to open the chest widely and to deal with destructive processes which previously were unrelieved. All the evidence that has been brought forward is intended as proof that the operation of thoracotomy is a sound and reasonable one.

Tuffier[7] writes a practical paper on the treatment of chronic empyema. He emphasizes the following points:—

1. One must first determine the bacteriologic nature of the effusion. Exploratory puncture is here of value; it is, in fact, of the first importance. Pneumococcic pleurisies are usually mild and are often cured by simple aspiration, while streptococcic pleurisies are grave and most often require thoracotomy.

2. If repeated punctures leave a residuum as shown by radioscopy, thoracotomy is done at the point of election in the posterior axillary line under local anæsthesia.

3. Evacuations of effusions and disinfection of the pleura follow. In certain cases the pleura can be closed *completely and immediately*. Example, 3 cases (2 pneumococcic with cure, 1 staphylococcic with return of suppuration and secondary disinfection with Dakin solution, secondary closure and cure). In most cases we should prefer drainage by siphon after thoracotomy. This is the most simple procedure. Radioscopic examination shows progressive diminution of the pleuritic process.

For bad conditions persisting in spite of drainage (as to pulse, temperature, and general condition), and a continued large infected cavity in the pleura, we proceed thus: Extensive thoracotomy and pleuroscopy under local anæsthesia, permitting a view of the form and dimensions of the pleuritic cavity; disinfection by the Dakin method, numerous Carrel tubes placed in all corners of the cavity. If a bronchopleural fistula exists, discontinuous injections of oxygen are substituted for the Dakin solution. When the culture curve has reached zero, and a dry compress placed at the opening of the cavity remains dry for twenty-four hours, complete closure is made of the surgical orifice, resection of the edges of the fistula, tamponing of the pleura to avoid discharge of blood into the interior, and complete suture of the wound. One thus transforms the former pyothorax into an aseptic pneumothorax which is spontaneously cured by bringing back the parietal pleura into contact with the lung.

The object of all modern operations is to fill the cavity, and to do this the lung must return to its contact with the pleural membrane. The Estlander operation provides for obliteration of the cavity with abolition of pulmonary function, but all modern procedures attempt, by removing the pleural shell, to permit the lung to return to its proper position, and to function normally.

Disinfection of the cavity should precede radical operation. Tuffier recommends the following method: The Carrel-Dakin method is preferable when possible. Rubber tubes are armed with silver wire, very fine and pliable, and placed in such a fashion as constantly to irrigate the cavity and all diverticula (*Fig.* 83). This procedure is indispensable and the essential of the method. It is necessary to have several tubes and to place the patient in a position permitting the antiseptic liquid to have access to the diverticula. Disinfection may be more or less rapid, but it is often very slow. Its progress is mapped by curves. This procedure may be impracticable if there is a bronchopleural fistula. Irrigation produces cough and a chlorine taste in the mouth which cannot be borne. Therefore, before placing the tubes, introduce into the pleural cavity a wick of gauze to tampon the bronchial orifice and prevent a flow of the liquid to the mouth. At the time of injection one can also place the patient in lateral decubitus, lying upon the fistula. These means are often sufficient at the beginning of treatment; later the liquid no longer passes into the bronchi, probably as a result of spontaneous narrowing of the bronchopleural orifice, and disinfection becomes easy.

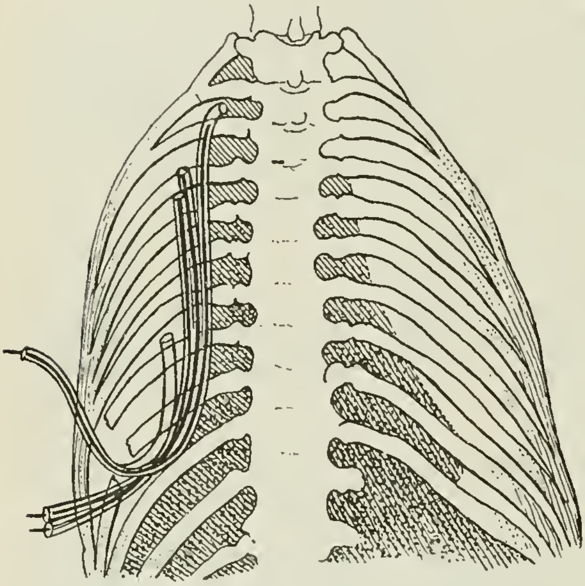


Fig. 83.—Rubber tubes, armed, introduced into the fistula for purposes of disinfection.
(*Re-drawn from the 'Annals of Surgery'.*)

To summarize: Chronic pleurisies are exceptional when acute effusions are well treated. Chronicity depends on a chronic pulmonary infection or on special anatomic peculiarities. Costal resection in the treatment of chronic empyema should be reduced to the minimum. Closure of the surgical incision and pleural decortication should be preceded by disinfection of the cavity, and then gives success which was formerly unknown.

Hedblom[8] summarizes a long paper on the treatment of empyema as follows: From the study of the literature and of 150 cases from the Mayo Clinic, the following tentative conclusions may be drawn:—

1. Chronic empyema has been recognized and treated during twenty-six centuries, but it is only sixty years since the first rib resection for drainage was done. The successive stages in the progress of treatment since that time are as follows: (*a*) Increasingly radical treatment, designed to obliterate the cavity by the collapse of the chest wall, involving successively more extensive operations and culminating finally in a complete radical resection; (*b*) A conservative trend manifested primarily in the modifications of the complete resection, but more in the attempt to preserve the chest wall than to restore the lung to its structural and functional relationships as first advocated

by Delorme; (*c*) The adaptation of the Carrel-Dakin hypochlorite solution technique to the treatment of chronic empyema cavities.

2. Chronic empyema is a disease which is not incompatible with life nor with a fair degree of health and usefulness. The principles of treatment should be, therefore, first, the preservation of life, and second, as far as possible, the conservation of function. Shortening convalescence, while very desirable, should always be a subsidiary consideration.

3. The choice of treatment must be made with cognizance of the variable etiology and pathology of the process, and the general condition of the patient.

4. A major procedure is indicated only if non-operative or less extensive surgical treatment reasonably may be considered less effective.

5. In case of sinuses and small cavities, adequate drainage is usually sufficient to effect a cure with or without short preliminary hypochlorite solution treatment. It is at least open to question whether a radical operation is indicated in these cases for the sole purpose of shortening convalescence at the risk of an appreciably increased mortality.

6. Dakin's hypochlorite solution treatment is the method of choice in the treatment of the ordinary type of chronic empyema cavity of any size, for the following reasons: (*a*) The general condition of the patient is, as a rule, improved to a remarkable degree; (*b*) The cavity may be obliterated or greatly reduced in capacity by the liberation and expansion of the lung (resulting from the treatment); (*c*) If the lung expands in part the extent of a later operation will be proportionately reduced; (*d*) If the lung entirely fails to expand, the cavity will have become relatively sterile in preparation for operation, thereby lowering post-operative morbidity and mortality; (*e*) Pulmonary decortication will be materially facilitated in some cases, owing to the softening action of the solution on the visceral pleura.

7. A pulmonary decortication through a rib-spreading exposure after preliminary hypochlorite solution irrigation is the most conservative treatment for cavities that are not obliterated by drainage or Dakin's solution treatment alone. If such an operation is successful, the lung is restored to its normal structural and functional relationship, thereby obliterating the cavity. If the operation is only partly successful, the magnitude of a secondary destructive operation is proportionately decreased.

8. Since it is impossible to judge with certainty before operation of the relative expansibility of the lung in every recent non-tuberculous case, decortication should be done rather than a destructive operation, thereby giving the patient the benefit of the doubt.

9. If the lung does not expand, or if a considerable cavity persists following decortication, a plastic operation is indicated.

10. If the cavity is of considerable extent or the patient debilitated, a two- or three-stage plastic operation is to be recommended.

11. The recognition of tuberculous empyema is often difficult. A history of a primary pleurisy with effusion seems more often to signify a tuberculous condition than does a pulmonary lesion, unless the latter is active and extensive. A tuberculous empyema may be present in the absence of clinical or *x*-ray evidence of pulmonary involvement. The typical microscopic picture in the sectioned pleura or the demonstration of the bacilli in the exudate may constitute the only evidence in such cases.

12. A tuberculous empyema not secondarily infected should not be drained, and should be aspirated only for a considerable accumulation of fluid. For a tuberculous empyema secondarily infected, either by operation or spontaneously, drainage is necessary.

13. In the absence of bronchial fistulas and of bleeding, secondarily infected

tuberculous empyema may be markedly benefited by antiseptic solution treatment. The amount of fibrosis or other pathologic change in the lung in such cases determines the degree of expansion of the lung, whether following antiseptic solution treatment or decortication.

14. If the lung fails to expand in whole or in large part, a several-stage operation designed to collapse the chest wall is indicated. Tuberculous patients are relatively poor operative risks.

15. Adequate drainage is the first indication in cases of empyema cavities which are draining through large bronchial fistulas. The fistulas may be obliterated spontaneously following such treatment.

16. Operative closure of bronchial fistulas that persist is necessary to complete healing. It may be accomplished by decortication of the involved portion of the lung, with cautery, suture, or skin plastic to cover the opening of the fistula. Occasionally healing results from simple granulation of surrounding tissue after destruction of the epithelial lining of the bronchial stoma.

17. Closing the bronchus that is draining pus from within the lung may result in a secondary lung abscess.

18. A large bronchial fistula is a contra-indication to Dakin's solution treatment.

19. Sinuses of variable duration are common following more or less complete obliteration of empyema cavities; a large proportion eventually are obliterated without radical treatment; for those which persist, plastic operation is indicated.

20. Operative mortality in chronic empyema has been due largely to shock and infection. Reduction of the extent of operation and preliminary sterilization will materially lower this mortality.

MISCELLANEOUS AFFECTIONS.

Eggers[9] deals with the treatment of *bronchial fistulæ*, and comes to the following conclusions:—

1. Bronchopleural fistulæ usually close spontaneously.

2. In the few cases in which a fistula is responsible for the persistence of a chronic empyema, treatment favouring the obliteration of that cavity will result in a closure of the bronchus.

3. Bronchocutaneous fistulæ must be carefully studied, and their etiology and the condition of the lung taken into consideration.

4. As long as the fistula acts as a safety-valve for intrapulmonary suppuration it must not be interfered with.

5. Mobilization of the lung and fistula, allowing it to recede from its fixed position, is the most important factor in bringing about closure.

6. Muscle flaps are very valuable to cover the bronchial sinus after the necessary preparation has taken place. They aid in the closure and obviate deformity.

7. Cauterization of the fistula should always be done very lightly, simply to destroy the epithelium, never so deeply as to produce a slough.

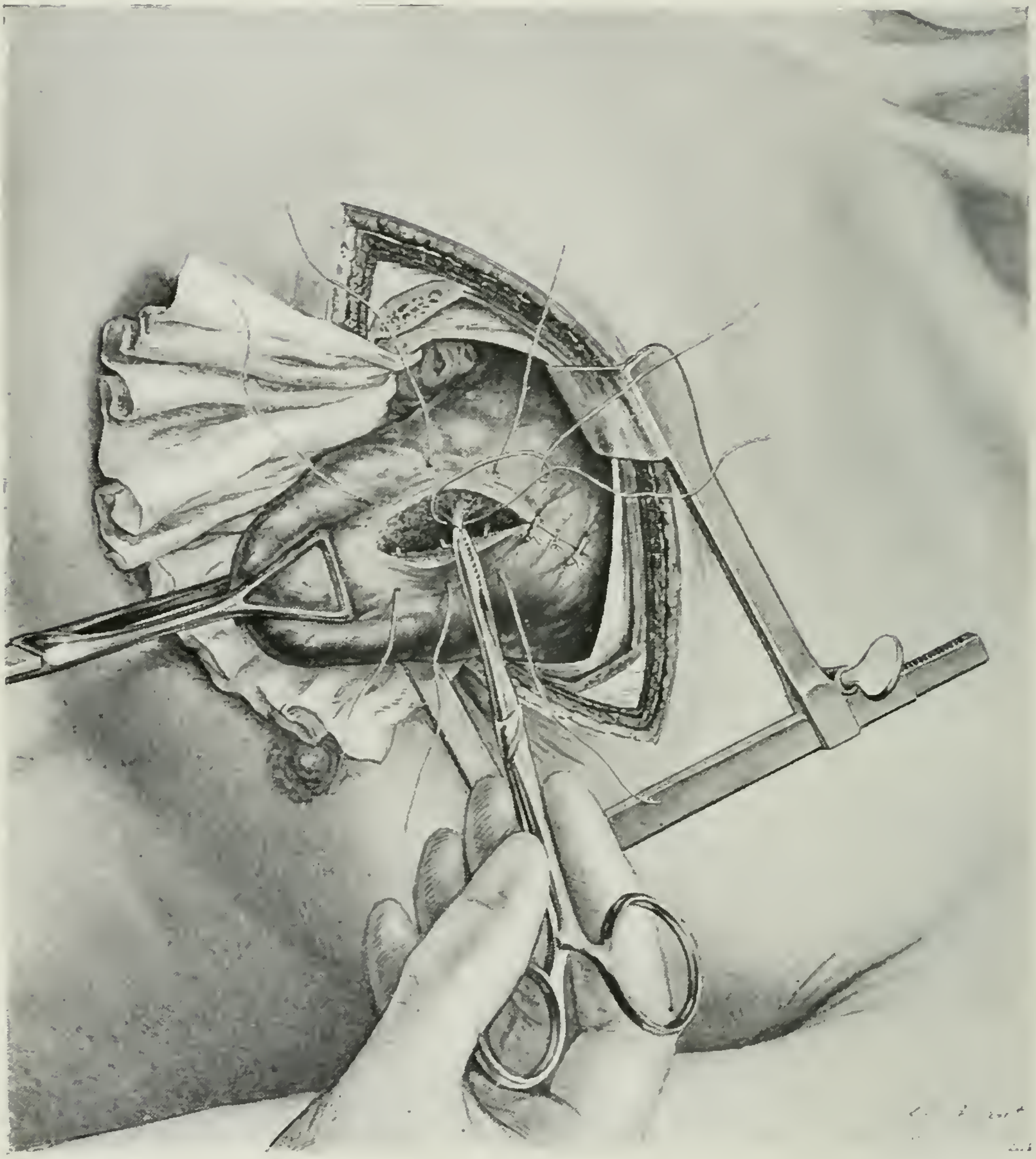
8. In case the wound is clean, suture of the bronchus should be done.

9. In cases due to lung abscesses, in which it is feared that closure of the bronchus may result in the damming back of secretions, with the danger of pneumonia, the bronchus should not be sutured, but a muscle flap simply laid over it, placing a drainage tube at some distance to act as a safety-valve.

10. Whenever possible the operation should be done under a local anæsthetic.

PLATE XXXV.

THORACIC SURGERY.



Exposure of the lung for the purpose of closing a wound in its substance. Deep U sutures and superficial 'peritonization' sutures have been inserted. Forcipressure and ligation of a pulmonary vessel are also shown.

From Duval's 'War Wounds of the Lung.'

Peters[10] points out that *abscesses of the lungs* are a common disease. Some writers attempt to make a distinction between abscess and gangrene, and this is impossible, for they are often compound. The diagnosis before extensive destruction has taken place, may be very difficult. The cough, the fœtid breath, and the expectoration of a large amount of mucopurulent sputum, are almost conclusive. Leucocytosis is not invariably present, and the temperature will probably depend on the amount of drainage possible by expectoration. *X* rays are, of course, a valuable aid to diagnosis in the case of lesions of the lung. The mortality of abscess of the lung could be greatly reduced by early operation. Peters believes that early drainage by the two-stage operation under local anæsthesia gives the highest percentage of recoveries.

[The reviewer has recently had an experience of two cases, one of gangrene of the lung, and the other of abscess localized by *x* rays. Both cases made a apid recovery after a single operation and direct drainage. In the case of gangrene, the pleural cavity was shut off. In the case of the localized abscess, the incision was placed too low, and the pleural cavity was opened ; it was packed off with gauze, and empyema did not follow the evacuation of pus from the interior of the lung.—W. I. de C. W.]

The accompanying illustration (*Plate XXXV*) shows the chest widely opened in a case of *gunshot wound of the lung*.[11] After excision of one or two ribs the opening is widely divaricated with rib separators of the Tuffier type. The collapsed lung is seen grasped in lung forceps, and, as shown, is easily delivered through the opening in the chest wall. If a projectile is present in the lung tissue it can be located by touch in this position with great facility ; the wound in the lung is repaired by fine catgut sutures, the pleura and periosteum of the ribs are sutured in one layer, the intercostal muscles are drawn together, the skin is united, and as a rule no drainage is employed.

Leopold[12] describes a case of *lipoma in the anterior mediastinum* weighing 17 lb. 6 oz. The patient was a male, age 37 ; he sought medical advice for a deep hollow cough, but otherwise was healthy. This was followed by shortness of breath, which in about five months' time was transformed into an alarming dyspnœa. Later on air hunger was continuous ; œdema of the lower extremities and abdomen was extreme. Röntgen-ray examination demonstrated a tumour filling about four-fifths of the chest. A complete post-mortem examination was performed, and microscopically the tumour was composed of fat-cells lying in a vascular connective-tissue matrix. The writer could only find four cases of lipoma recorded in the literature.

Leriche[13] deals with the *surgical treatment of suppuration in the posterior mediastinum*. A case is described in which the prominent symptoms were a peculiar cough and periodically recurring dysphagia of six years' duration. He describes an operation as follows : On Oct. 8 an incision was made 10 cm. in length along the anterior border of the sternocleidomastoid muscle to the sternal notch. When the right lobe of the thyroid was retracted toward the mid-line, a large abscess cavity was disclosed behind it, between the œsophagus and the trachea on the inner side and the sternocleidomastoid muscle and the large vessels on the outer side. The abscess could be followed into the superior and posterior mediastinum for about 9 to 10 cm. below the top of the sternum. A rubber drainage tube was left in the mediastinum, the rest of the abscess cavity packed with iodoform gauze, and the patient put to bed in Trendelenburg's position. The following day a siphon drain was arranged with the patient in the horizontal position. Later a soft rubber bulb (*Fig.* 84) was attached to the drainage tube, which the patient now and then adjusted for suction. The wound healed in seven weeks. Although there were small quantities of pus gulped up the day before the operation, there was at no time any evidence of œsophageal fistula.

Some authorities state that these abscesses should be drained by the dorsal as well as the cervical route. Several methods of approach in dorsal mediastinotomy have been described. The differences in the various operations consist mainly in the placing of the incision or the flap, and in the treatment of the ribs, the object in all being to separate the pleura from the ribs and vertebral column in order to gain access to the posterior mediastinum. Nasilow, Quénu and Hartmann, Rehn, Bryant, and others placed the incisions at some distance from the mid-line with more or less extensive resection of ribs, while Heidenhain's incision is close to the mid-line. He separates the fibres of the thick muscle layer and resects one transverse process or more with a small part of the attached rib. If more space is needed, a cross incision may be added. I have performed this operation on the cadaver, and, as there is probably less liability of tearing the pleura, the Heidenhain operation would perhaps be the one of choice in the draining of the mediastinal abscess.

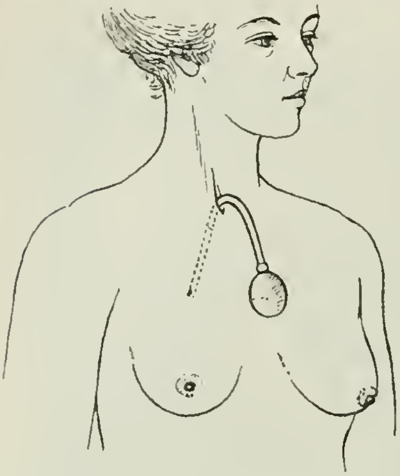


Fig. 84.—Bulb attached to drainage tube which patient adjusted for suction. (*Re-drawn from 'Surgery, Gynecology, and Obstetrics'.*)

REFERENCES.—[1]*Presse méd.* 1921, June 18, 483; [2]*Med. Record*, 1921, April 9, 595; [3]*Ann. of Surg.* 1921, April; [4]*Amer. Jour. Med. Sci.* 1920, Oct., 504; [5]*Med. Press and Circ.* 1921, March 16, 210; [6]*Lancet*, 1921, June 18; [7]*Ann. of Surg.* 1920, Sept., 266; [8]*Ibid.* 288; [9]*Ibid.* 351; [10]*Jour. Amer. Med. Assoc.* 1920, Oct. 16; [11]Duval's *War Wounds of the Lung*; [12]*Arch. of Internal Med.* 1920, Sept., 274; [13]*Surg. Gynecol. and Obst.* 1921, March, 232.

THREADWORMS. (*See* OXYURIS.)

THROAT, BACTERIOLOGY OF.

O. C. Gruner, M.D.

The relation between the organisms in the throat and cases of influenza has been investigated by many observers. Davis[1] has referred to the fact that streptococci, pneumococci, meningococci, hæmophil bacilli, diphtheria bacilli, and diphtheroids are to be found in the throats of normal persons. Much interest has centred round the streptococci, which have been classified into hæmolytic and non-hæmolytic. The former are associated with epidemic sore throats, and have been traced to milk supplies. These hæmolytic forms may be separated off into strains of certain types. Davis points out that the diplostreptococcus of influenza epidemics is really the same as Mather's coccus, a view formulated by Rosenow, Tunnicliff, and many others. Norton, Rogers, and Georgieff[2] have studied the so-called pleomorphic streptococci. These include both hæmolytic and green-producing types. They find that any buccal streptococci may pass through a pleomorphic phase, and a variation of the hydrogen-ion concentration of the medium in which they grow produces the phenomenon of pleomorphism. Inulin broth is more efficient in this direction than dextrose broth. Park, Williams, and Krumwiede[3] suggest that each of the different groups of microbes supposed to be the cause of influenza epidemics is really an assemblage of many types. There is no common filterable organism.

Gordon[1] gives a valuable contribution on the subject of throat streptococci, and presents evidence of the distinctive nature of those found in scarlet fever, as going far to prove the specific causal relation between the coccus and the fever. Although this streptococcus is superficially identical with the pyogenes form familiar in septic conditions, there is an absolute difference serologically. This supports Tunnicliff's findings.[5] Bloomfield,[6] in two papers on the bacterial flora of the upper air-passages in colds, concludes that pneumococci, streptococci, and staphylococci are secondary invaders, and that the real causal agent remains unknown.

The bearing of all this work on vaccine therapy, especially for influenza, is of special interest. It appears to be agreed that vaccination does not prevent the incidence of colds. The only advantage of the procedure is that pneumonia is less likely to supervene in a vaccinated person (Park and co-workers[3]).

The carrier question has been studied by Bloomfield[7] in the case of various organisms. When avirulent diphtheritic organisms are implanted on normal throats, they take hold and are extremely difficult to get rid of. But they cause no symptoms, and do not appear to be of importance to other persons. He found that 5·8 per cent of unselected individuals are carriers for Friedländer's bacillus, which makes its home in the tonsil, and thence travels into the pharynx and sometimes into the nose. But in the case of this organism, transplantation to another person is not possible.

Crookshank[8] points out the defensive value against infections provided by the mucous secretion in the throat and upper air-passages. He shows that deficiency of mucus is an important factor in the lack of immunity to colds, as well as a likely factor in the production, for instance, of gastric ulcer.

Mulloy[9] refers to the belief that the organisms of the throat are not *per se* the source of the diseases attributed to them. This is, however, more easy to perceive than to demonstrate.

REFERENCES.—[1]*Jour. Amer. Med. Assoc.* 1920, Sept. 18, 792 ; [2]*Ibid.* 1921, April 9, 1003 ; [3]*Jour. of Immunol.* 1921, Jan., 1 ; [4]*Brit. Med. Jour.* 1921, i, 632 ; [5]*Jour. Amer. Med. Assoc.* 1920, Nov. 13, 1339 ; [6]*Johns Hop. Hosp. Bull.* 1921, Feb., 33, and April, 121 ; [7]*Ibid.* Jan., 10 ; [8]*Brit. Med. Jour.* 1920, Oct. 23, 627 ; [9]*Practitioner,* 1921, June, 435.

THROMBO-ANGIITIS OBLITERANS.

Carey F. Coombs, M.D., F.R.C.P.

Thrombo-angiitis obliterans (Buerger's disease) is an inflammatory disease of the blood-vessels of unknown origin. It affects all the coats of both arteries and veins. It begins usually in the blood-vessels of the legs below the bifurcation of the popliteal artery, and from here spreads by continuity or appears independently in other vessels. It has a tendency to periodic relapses, and ends fatally when some important vessel, such as the renal or a large visceral artery, is attacked. In this country and in America it is almost entirely limited to middle-aged male members of the Jewish race of Russian extraction. (*See* MEDICAL ANNUAL, 1910, p. 162 ; 1916, p. 103 ; 1917, p. 99 ; 1918, p. 549 ; 1919, p. 427.)

TREATMENT.—In 1915, Mayesima showed that there was a constant high viscosity of the blood in all types of gangrene. Acting on this suggestion, Koga used **Ringer's Solution** hypodermically over long periods of time and reported many cures. Meyer followed Koga's idea, and was the first to use **Sodium Citrate** intravenously in conjunction with Ringer's solution hypodermically. He used a small dosage over a short period of time, and many of his patients relapsed and had to undergo amputation.

Steel[1] has employed the **Sodium Citrate** method for the last three years with encouraging results. "During the first month the patient is kept in bed with the legs constantly under a hot-air electric-light bath at 110°; 250 c.c. of

2 per cent sodium citrate solution is given intravenously every second day. The second month the interval of injection is lengthened to every third or fourth day; daily leg massage is given, and the patient is put in a wheel chair with the feet hanging down a short time each day; or if the case is not advanced, some walking is allowed. The intervals of injection are now gradually lengthened until at the end of a year the patient gets one every two weeks. Increased walking is permitted as the symptoms subside and evidence of a functional collateral circulation appear. **Potassium Iodide** is given during the whole course of treatment, and is always well borne. The length of treatment is regulated by the results obtained in establishing a functional collateral circulation.

"The effects of this plan of treatment have been: (1) Relief of pain after the second injection; (2) The checking of the gangrene and spontaneous amputation of the dead tissue; (3) Healing of indolent, painful ulcers; and (4) A slow but sure establishment of a collateral circulation, as shown by improved colour, warmth of the foot, the swelling of the subcutaneous veins, and a strengthening of any existing pulse. In two cases there occurred a re-establishment of an anterior and a posterior tibial pulse."

"The injections are given in the veins of the arm through a curved slip joint needle, by the usual skin-puncture method. No bad after-effects were noted.

"Six patients in all have been treated. Two have resumed their regular occupations. One is walking again, functionally able, but has no financial need to set him to work. One with a previous leg amputation has resumed his occupation as a playwright. One case is progressing satisfactorily. In the sixth case, a desperate one, the patient walked after one year of treatment, but suffered a relapse after four months of walking. He is now yielding to a second course of injections."

REFERENCE.—[1]*Jour. Amer. Med. Assoc*, 1921, i, 429.

THYMUS GLAND. (*See* ENDOCRINOLOGY.)

THYROGLOSSAL CYSTS. (*See* MOUTH AND FACE.)

THYROID DISEASE. (*See* GRAVES' DISEASE.)

THYROID FUNCTION TESTS.

O. C. Gruner, M.D.

The chief test of the day for determining the efficiency of the thyroid gland consists in the determination of the 'basal metabolic rate'. This is the name given to the metabolic state of the body when it is at complete rest, with the digestive processes at their normal daily minimum. It is, for clinical purposes, estimated by indirect calorimetry; that is, it is measured in terms of the respiratory exchange and quotient. As Earle and Goodall[1] point out, the use of this method of clinical diagnosis has not been feasible until a simple apparatus was put forward by Benedict.[2] This apparatus consists essentially of a closed circuit containing (1) a spirometer bell, (2) an electric fan, (3) jars for soda-lime and calcium chloride. The patient breathes into and out of this circuit through a special mouthpiece, nasal respiration being cut out by means of a nose-clip. The spirometer is filled with atmospheric air and oxygen (1–2). The fan keeps this mixture circulating along with the expired gases through the soda-lime and back to the patient. The spirometer is accurately counterpoised by means of a weight and pulley, and the movements downwards, as oxygen is absorbed by the patient and as CO_2 is absorbed by the soda-line, are easily seen. The oxygen absorption can be read off directly. These authors take a permanent record in ink by means of a kymograph.

They do not see any serious objections to the procedure, although a number of observers have criticized the apparatus. McCaskey[3] and Roth[4] both speak strongly in its favour. H. M. Jones,[5] however, believes that the method can be simplified considerably, so that readings may be made directly in terms of calories per hour per square metre of body area.

Theoretical Considerations.—McCaskey says : "It places before the clinician, with very moderate effort, an exact measure of the 'speed' with which the stream of life's chemism is being driven." The amount of oxygen used up measures the degree of combustion. Every litre of oxygen is equivalent to a certain number of calories, which varies according to the substances undergoing oxidation. This calorie-equivalent is capable of being calculated from the respiratory quotient, and the apparatus enables the latter to be estimated. It has been found that in disorders of the thyroid gland, the metabolic rate is increased up to 40 or 50 per cent. But, as McCaskey points out, it does not follow that in such a case the thyroid is playing the major part in the pathology. Focal infections, for instance, might be the cause of the changed activity. If the increase amount to 75 or 100 per cent it is practically certain that thyroid is the major factor. The normal number of calories per square metre per hour at different ages is given in the following table :—

AVERAGE NORMAL CALORIES PER SQUARE METRE PER HOUR FOR DIFFERENT AGES AND SEXES.*

Age.	Calories. Males	Calories. Females.
14 to 16	46·0	43·0
16 to 18	43·0	40·0
18 to 20	41·0	38·0
20 to 30	39·5	37·0
30 to 40	39·5	36·5
40 to 50	38·5	36·0
50 to 60	37·5	35·0
60 to 70	36·5	34·0
70 to 80	35·5	33·0

* Published by Aub and Du Bois, and given in the manual by Boothby and Sandiford.[6]

Means and Woodwell[7] have advanced evidence to show the correctness of the statement that the basal metabolism is, in health, a simple function of the body surface.

Stansfield[8] cites five cases in which this method of examination enabled the detection of aberrant forms of hyperthyroidism.

REFERENCES.—[1]*Lancet*, 1921, i, 853 ; [2]*Boston Med. and Surg. Jour.* 1920, ii, 449 ; [3]*Jour. Amer. Med. Assoc.* 1921, i, 978 ; [4]*Boston Med. and Surg. Jour.* 1921, i, 222 ; [5]*Arch. of Internal Med.* 1921, Jan., 48 ; [6]*Laboratory Manual of the Technic of Basal Metabolic Rate Determinations*, Philadelphia, W. B. Saunders Company, 1920 ; [7]*Arch. of Internal Med.* 1921, May, 608 ; [8] *Boston Med. and Surg. Jour.* 1921, i, 235.

THYROID GLAND, ADVANCES IN STUDY OF. (*See* ENDOCRINOLOGY.)

THYROID GLAND, SURGERY OF.

James Berry, F.R.C.S.

INDICATIONS FOR OPERATION.

The great majority of cases of goitre require no operative treatment. Soft uniform enlargements, in which the bulk of the swelling consists of accumulated colloid secretion, especially in young people, often subside spontaneously or can be made to do so by medical treatment. In many other cases the swelling persists but does no harm, and requires no surgical treatment unless demanded by the patient on the ground of mere deformity. It is just as wrong to deal by operation with a soft colloid goitre of moderate size, as to attempt to treat by medical means an old cyst or adenoma in which fibrotic or other permanent degenerative changes have occurred. The more advanced the degenerative changes in a goitre, the less likely is medicine to effect a cure.

In a minority of cases, operation is demanded for the following reasons: (1) *Dyspnœa*, especially if severe and progressive; (2) *Deformity*; (3) *Certain disturbances of the circulatory and nervous systems*, mostly connected with alteration in the secretion of the thyroid gland (including exophthalmic goitre); (4) *Malignancy*.

1. **Dyspnœa.**—Contrary to what is often stated in text-books, the dyspnœa of goitre is never produced by direct pressure of the isthmus upon the front of the trachea. It is the lateral lobes and not the isthmus that cause the injurious pressure. *Plate XXXVI, A* and *B*, both taken from cases in which the patient died of suffocation produced by the pressure of a goitre, show the two common ways in which the trachea is compressed.

In the first (*Plate XXXVI, A*), from a young adult with a large symmetrical bilateral parenchymatous goitre, the trachea has been gradually pinched laterally until a point has been reached when some slight movement of the goitre led to a sudden and fatal occlusion of the air-passage. This is the invariable mode of death when suffocation occurs in young people with simple parenchymatous goitre. The final and fatal increase in the pressure may occur either quite suddenly, from kinking of the already much narrowed and collapsed trachea, or rather less suddenly, in a few hours or a few days, by a rapid swelling of the whole goitre, due to increased secretion into the vesicles—generally caused by catarrhal inflammation. Intraglandular hæmorrhage is almost unknown in this type of goitre.

In the second illustration (*Plate XXXVI, B*), from a much older patient, there is a large prominent swelling in the neck. This cervical portion of the goitre may have been unilateral or bilateral (for the left half is not shown in the specimen), but the cause of the fatal dyspnœa is the extension of the inferior horn of the right lobe into the narrow and rigid upper opening of the bony thorax. The constriction between the larger cervical portion and the much smaller, and more or less globular, intrathoracic portion is marked by a deep groove in which lay the first rib. *Plate XXXVI, B*, A, which gives an oblique view taken from the left side, shows, even in the present post-mortem condition of the specimen, that the trachea has been flattened obliquely from the right side. It is obvious that, in such a case, removal of the prominent cervical portion of the goitre, which may be a comparatively easy proceeding, will be of no use in relieving the dyspnœa, unless the operator recognizes the existence of, and removes, the intrathoracic portion, which is the main, if not the only, cause of the dyspnœa.

These intrathoracic prolongations, which are quite common in middle-aged and elderly subjects of goitre, nearly always contain tumours, either cystic or solid, which are more or less encapsuled. They have no large vessels entering them from below, so they can be drawn up into the neck and removed. The operator must be careful not to damage any of the surrounding very important structures (pleura, large veins, recurrent nerve, etc.). Often the cervical portion of the goitre is quite small, the main mass lying in the thorax. The superficial observer, confronted with a case of a large prominent goitre with dyspnœa, may easily conclude erroneously that what he sees in the neck is the cause of the dyspnœa, and may fail to observe, or even to suspect, the existence of the really far more important substernal, or intrathoracic, source of tracheal pressure (*Plates XXXVI, B, XXXVIII, B*).

Encapsuled thyroid tumours, especially if cystic or soft solid, are very prone

PLATE XXXVI.

THYROID SURGERY

[*Of Plates XXXVI–XLVIII, seven of the figures are original, the remainder having been kindly lent by the* BRITISH JOURNAL OF SURGERY.]

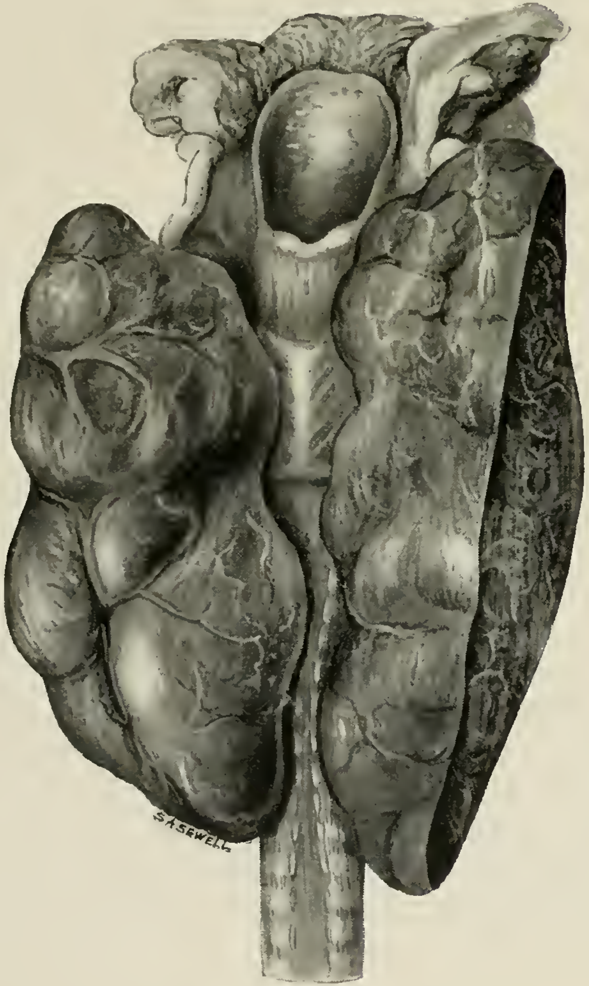


Fig. A. View from behind of a large parenchymatous goitre with larynx and trachea, showing the usual scabbard shape of compressed trachea. From a man with chronic dyspnœa, age 20, who died in bed quite suddenly, of suffocation. ($\frac{4}{5}$.) *Roy. Free Hosp. Mus. No. xxii. 96a.*

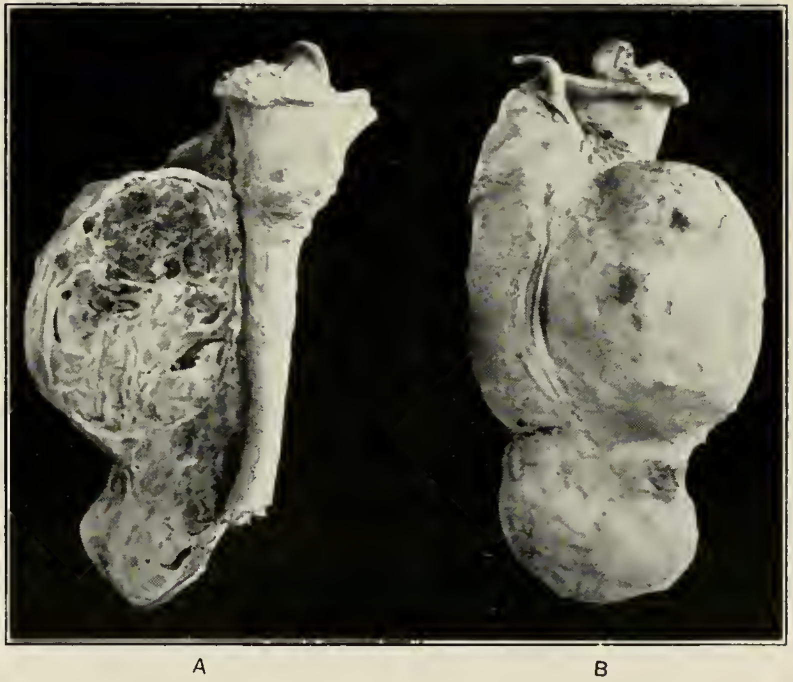


Fig. B.—An old parenchymatous goitre with much fibrosis. The lower portion extended into the thorax and caused death from suffocation. From a male patient, age unknown. **A**, Section, viewed obliquely from the front and left side; **B**, External view from the right side. ($\frac{1}{3}$.)
St. Mary's Hosp. Mus. No. 45, 72²,

PLATE XXXVII.

THYROID SURGERY—*continued*

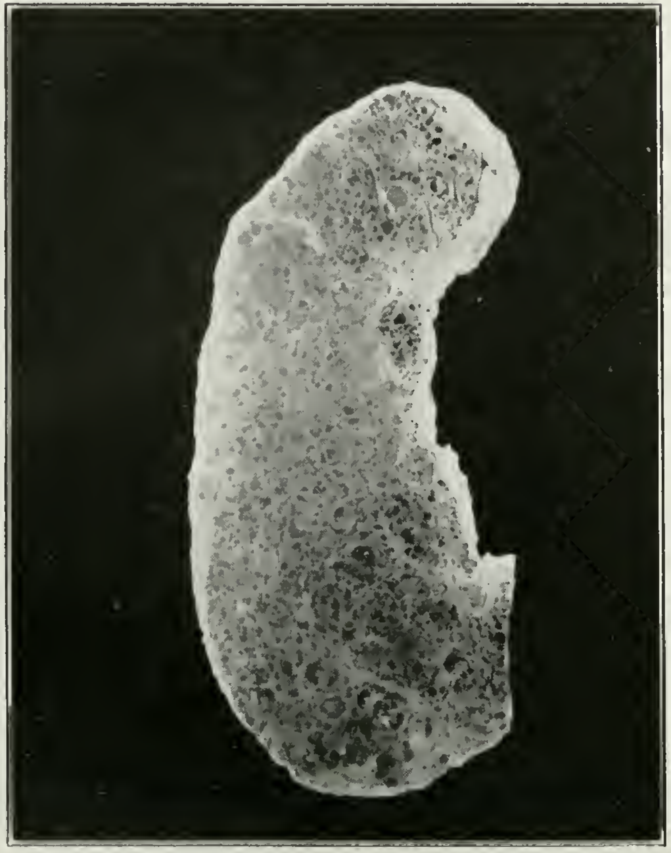


Fig. A.—Simple parenchymatous (colloid) goitre, showing all vesicles distended with colloid. From a boy, age 15. (× ½.)

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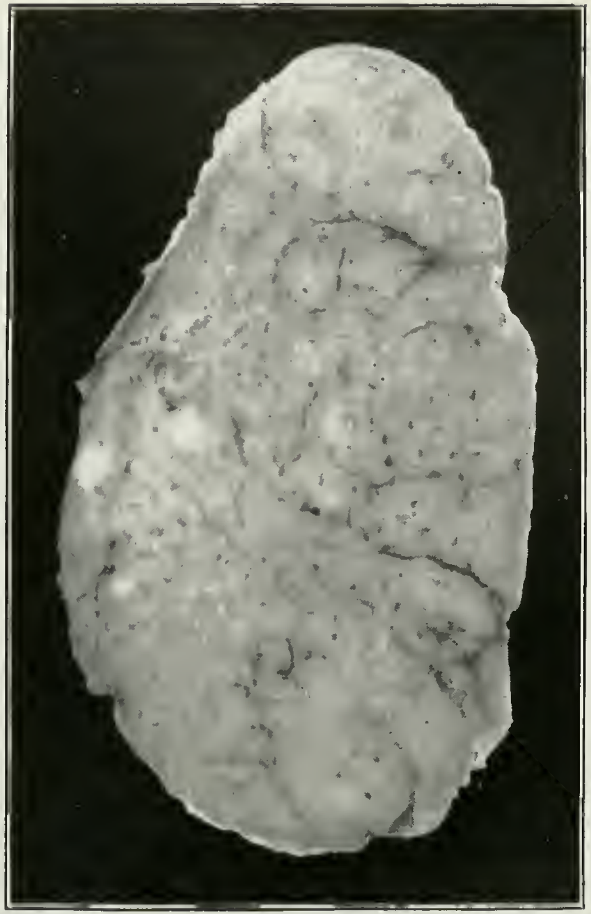


Fig. B.—Typical exophthalmic goitre removed from lady, age 29. Weight 4 oz. In this disease there is an absence of colloid, the vesicles being filled with masses of proliferating epithelium. The gland presents a solid appearance like that of pancreas, very different from the vesicular 'parenchymatous' goitre seen in *Fig. A.* (× 1.)

Roy. Free Hosp. Mus. No. Ea Jd, b11.

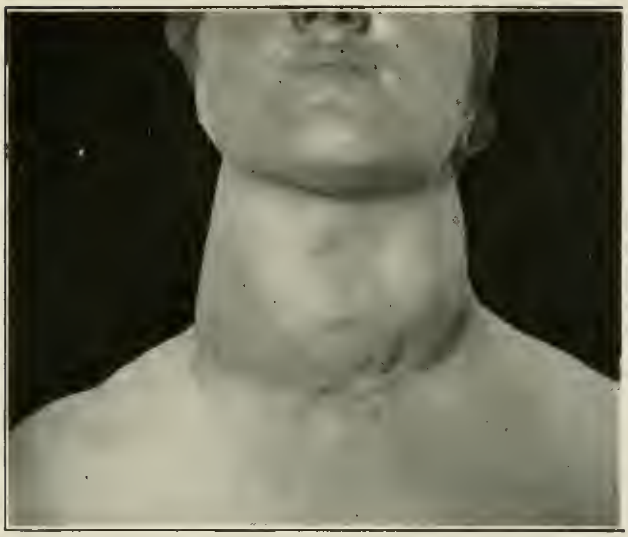


Fig. A.—Adenoparenchymatous goitre causing dyspnœa and considerable distention of veins at root of neck. F., age 27.

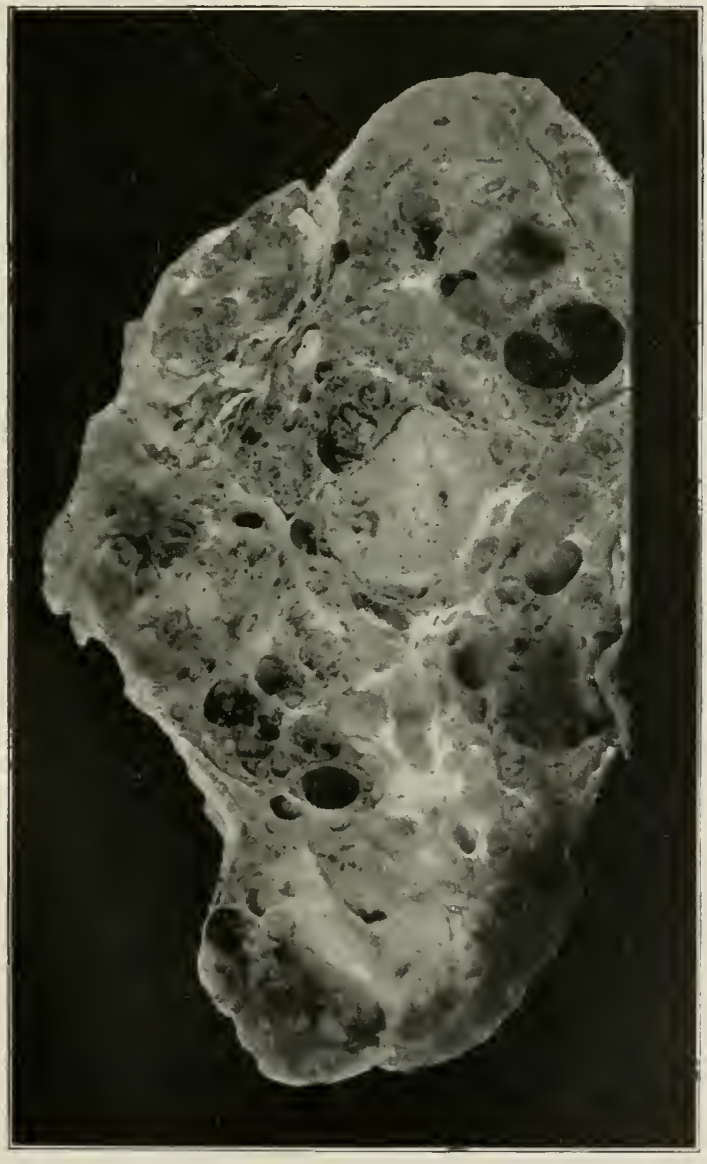


Fig. B.—Section through goitre removed from preceding. Lobulation and fibrosis more advanced than in *Plate XXXVII, Fig. B.* Solid adenomatous masses in various parts. Weight of portion removed 12¾ oz. The lower part extended into the thorax. (× 1.)

Roy. Free Hosp. Mus.

PLATE XXXIX.

THYROID SURGERY—*continued*

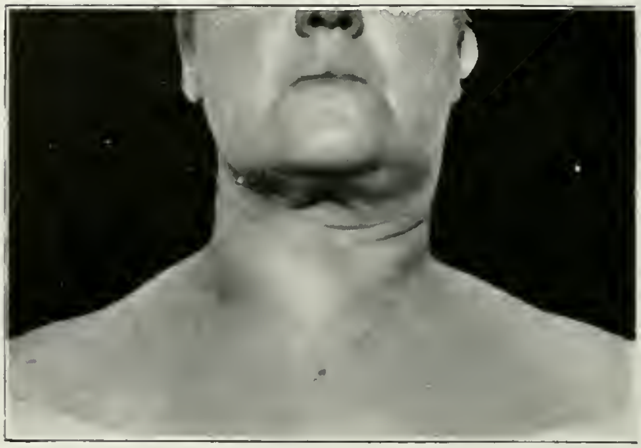


Fig. A.—Solid unilateral, mainly intrathoracic, goitre, the upper part of which rises into neck. F., age 65. Removed by resection-enucleation on account of dyspnœa and œdema of the arm.

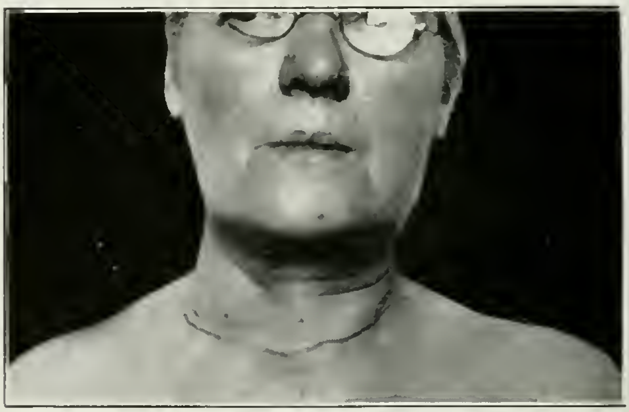


Fig. B.—The preceding, three months after operation.

to spontaneous intraglandular hæmorrhage, which may cause rapid increase in size, leading to severe or even fatal dyspnœa. (An excellent specimen of the latter may be seen in the museum of University College Hospital, No. 11B).

Operation is indicated in any case of innocent goitre which causes marked stridor or produces suffocative attacks, especially at night or during exertion. Irregularity and rapidity of the heart's action often accompany chronic goitre with dyspnœa, and may be an important additional indication of the necessity for operative treatment. It must be remembered, however, that any operation for goitre with dyspnœa, especially if attempted by inexperienced or unskilful hands, has very distinct difficulties and risks of its own, which must be foreseen and carefully guarded against.

A patient who gives the history that his goitre is gradually getting less prominent, while at the same time his breathing is becoming more and more difficult, nearly always requires operation. This combination usually means that the goitre is passing down into the narrow upper opening of the thorax and becoming jammed there.

Occasionally the intrathoracic portion of a goitre attains a great size. If it is wholly below the upper opening of the thorax, such a tumour may cause very little respiratory distress except when it is driven up into this opening by coughing. A severe paroxysm of dyspnœa may then be produced.

Most substernal and intrathoracic goitres can be diagnosed by careful palpation of the root of the neck during the act of swallowing. A good radiogram of the thorax is often of great assistance in determining how far the tumour has descended into the thorax, and the extent to which the trachea has been displaced or compressed. Substernal and intrathoracic goitres often cause considerable distention of the superficial veins at the root of the neck. These may help in the diagnosis (*Plate XXXVIII*).

Dyspnœa due to heart disease, true spasmodic asthma, laryngeal growths, aortic aneurysm, or other mediastinal tumours, may easily be attributed erroneously by the patient or his doctor to a co-existing goitre. Such errors should be avoided by careful and thorough physical examination of the neck and chest.

2. **Deformity.**—It is rarely justifiable to recommend operations for mere deformity in cases of bilateral uniform enlargement of the gland, unless of very great size. Strictly unilateral swellings other than cases of inflammation and malignancy are almost always encapsuled tumours, cystic or solid. Such tumours, if large enough to constitute a definite deformity, may be removed, at the wish of the patient, by any operator who is familiar with the difficulties and possible dangers of this class of operation. The higher in the neck and the more prominent the goitre, the more justifiable is its removal on the ground of mere deformity. The lower its situation, the more likely it is to produce dyspnœa.

In the case of large unilateral goitres which have produced much displacement of the trachea, but as yet no serious dyspnœa, operation is generally to be recommended. Although the actual risk to life is not very great, such goitres, especially in elderly people, are always liable to sudden increase in size from intraglandular hæmorrhage or catarrhal inflammation. If this takes place, the condition of the patient may quickly pass from one of comparative ease and comfort to one of considerable danger. Similarly, very large goitres, whether unilateral or bilateral, which are steadily increasing in size, even if they have not already begun to cause dyspnœa, often require operation because of the danger of the sudden supervention of serious suffocative symptoms from kinking of the trachea, intraglandular hæmorrhage, etc.

On the other hand, it should be remembered that many patients live to a good old age with a goitre of considerable size without ever suffering any marked inconvenience from it. The removal of a large, movable, unilateral, thyroid tumour is fairly simple if ordinary precautions are taken. Such operations are among the easiest that the writer has to perform.

Unilateral goitres of moderate size in younger subjects may often be removed with propriety if they are steadily increasing in size, and especially if they are beginning to cause discomfort and palpitation, as such goitres often do. The solid forms of encapsuled tumour in thin subjects are often accompanied by a good deal of general ill health which may quickly disappear after removal of the tumour. Small tumours, cysts and adenomata, often not larger than a cherry, when situated at the back and inner part of the gland, occasionally produce quite severe symptoms by causing pressure upon the posterior part of the trachea, the recurrent nerve, and, less commonly, the œsophagus. They are often difficult to diagnose. Deeply seated, and covered by the more or less normal lobe of the gland which is pushed forward by the tumour, the existence of the growth is often overlooked, the case being mistaken for one of simple enlargement of the whole lobe. The laryngoscope is often of great use in such a case. Removal is generally indicated.

Goitre in children below the age of puberty should seldom be operated upon for mere deformity, on account of the danger of interfering with growth and development. No operator should attempt to remove a goitre on the ground of mere deformity unless he has had some previous experience of such operations and is aware of the difficulties and dangers he may expect to meet with.

3. **Certain Disturbances of the Circulatory and Nervous Systems.**—Under this heading may be grouped clinically three classes of case :—

a. Cases of simple goitre with chronic dyspnœa, in which the heart is beginning to be dilated. Attacks of tachycardia and irregularity of the pulse become increasingly common. The cardiac condition naturally increases the risk of the operation to a certain extent, but if not too advanced is generally to be regarded as an urgent indication for the necessity of an operation. The heart in these cases is the so-called 'pneumomechanical' goitre heart.

b. Cases of localized innocent tumour, generally cysts or adenomata, attended by persistent or frequent tachycardia, and often with vague symptoms of functional derangement of the gland, nervousness, etc., but without exophthalmos. Such cases can usually be completely cured by removal of the tumour. They are common, and are often, in the opinion of the writer, erroneously confused with cases of true Graves' disease. Operation in these cases is far less dangerous than in the latter.

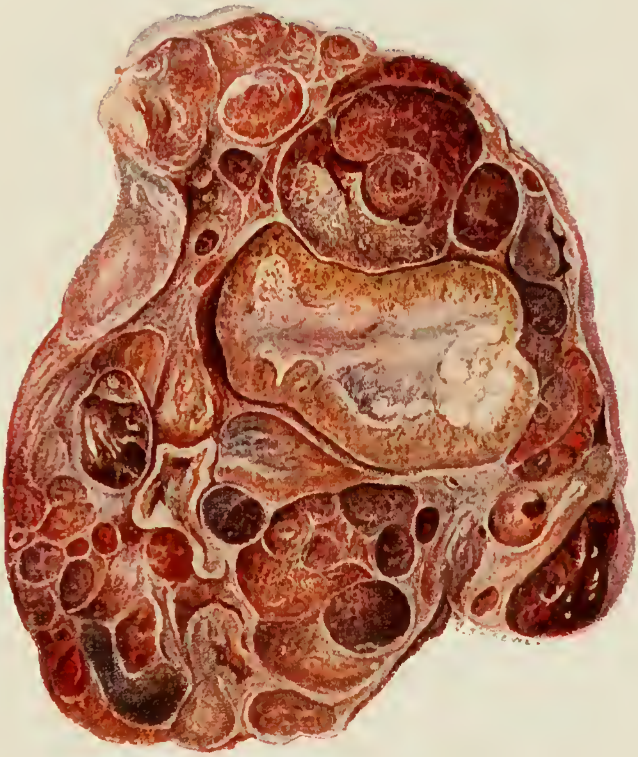
c. Cases of true Graves' disease, easily recognized for the most part by the well-known symptoms. In some of these cases operation is to be recommended, but it must always be looked upon as a somewhat formidable proceeding, not to be lightly undertaken without due consideration of its risks and limitations. As a general rule it may be stated that operation is not to be undertaken until medical means have been given a fair trial, since many cases undoubtedly recover spontaneously, or under medical treatment, although no medical treatment has yet been found which is certain to cure.

It has not yet been proved that early operation is sufficiently certain to cure to make it very desirable that the patient should undergo the undoubted risks to life which must accompany such an operation.

Operation should not be undertaken during an acute exacerbation of the disease, but rather in the interval. Much mental excitement, great muscular

PLATE XL.

THYROID SURGERY—*continued*



Adenoparenchymatous goitre removed from a woman, age 64, on account of dyspnœa. (× 1.)

Roy. Free Hosp. Mus. No. xxii, 21.

PLATE XLI.

THYROID SURGERY—*continued*

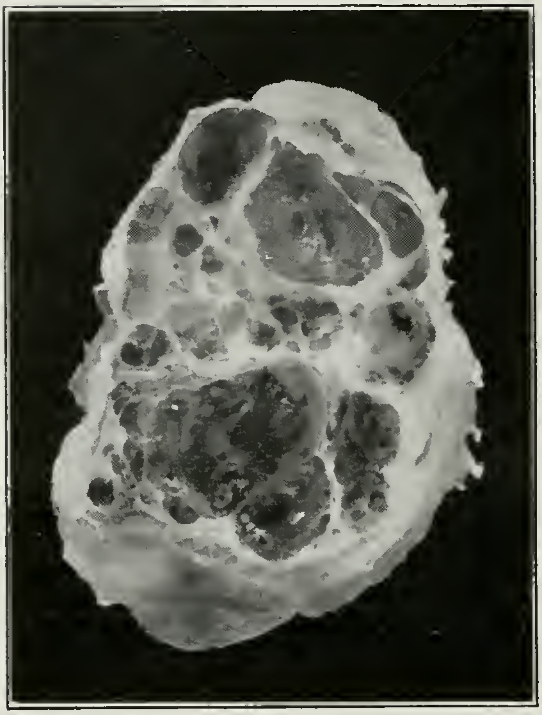


Fig. A.—Section of a large, old parenchymatous goitre with much fibrosis. F., age 52. Weight 49 oz. (× $\frac{2}{5}$.)

Roy. Free Hosp. Mus. No. xxii, 19.

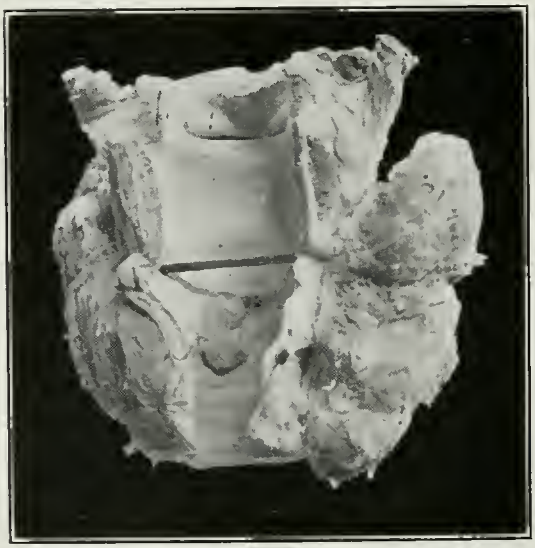
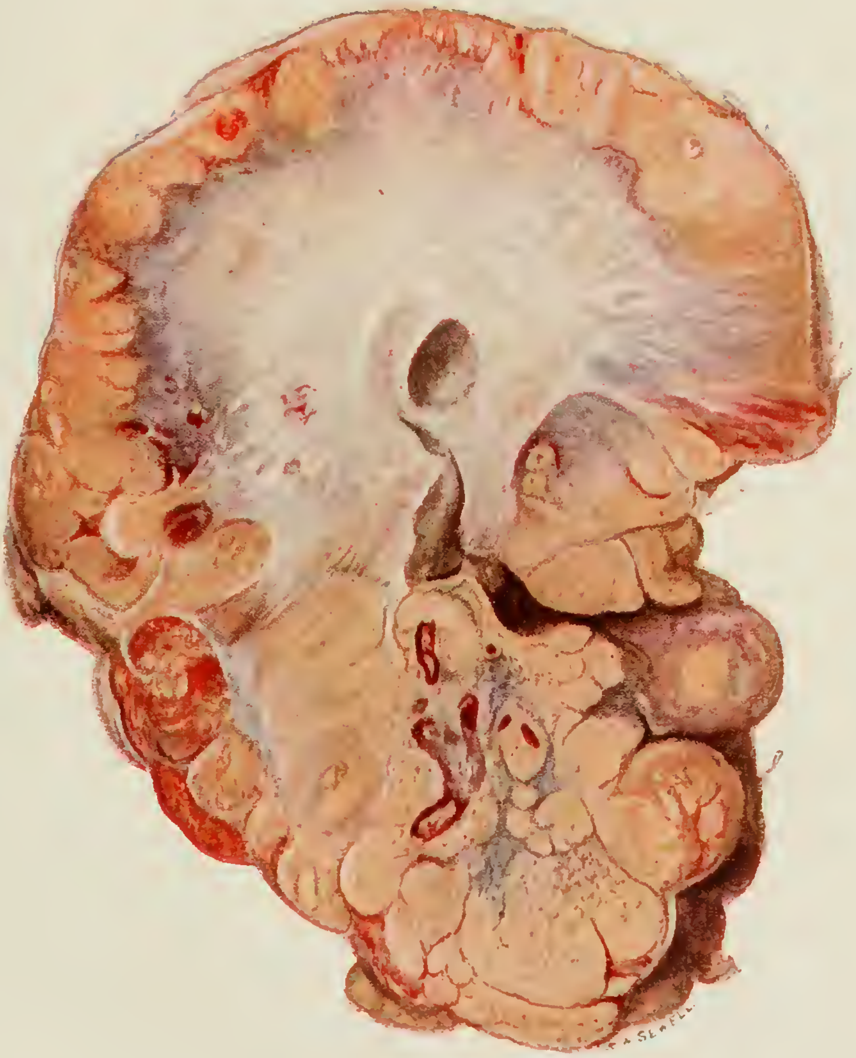


Fig. B.—Thyroid gland, larynx, etc., laid open from behind, showing fungation of a malignant thyroid into the trachea. It will be noticed that the thyroid itself is not greatly enlarged, although already hopelessly incorporated with the trachea. (*Slightly reduced.*)

Westminster Hosp. Mus. No. 616a.

PLATE XLII.

THYROID SURGERY—*continued*

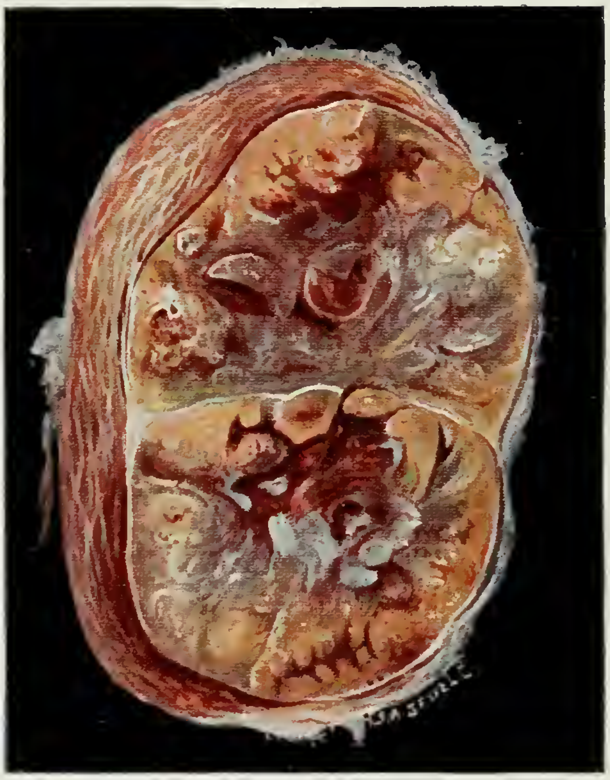


Carcinoma engrafted on an old innocent fibroid goitre. From a woman, age 43. ($\frac{2}{3}$.)

Roy. Free Hosp. Mus. No. 57a.

PLATE XLIII.

THYROID SURGERY—*continued*



A well-encapsuled solid adenoma (fœtal type) covered by thick layer of compressed but otherwise fairly normal gland-tissue. F., age 36. Removed by resection-enucleation. (× 1.)

Roy. Free Hosp. Mus. No. xxii, 70.

weakness, persistent diarrhœa, much dilatation of the heart, especially if acute, with myocardial degeneration, are all to be regarded as signs of grave import, and while they last generally contra-indicate the performance of any large operation such as removal of a portion of the thyroid gland. There are many cases, however, in which ligation of one or both superior thyroid arteries will afford at least temporary improvement, and will be a safe proceeding in comparison with the larger operation. Those who assert that ligation of the superior thyroid artery is just as dangerous as removal of a portion of the gland have usually had but little practical and personal experience of both operations. The chief objection to ligation is that the amount of benefit that follows is not as great or as lasting as that which commonly follows a partial thyroidectomy. The most suitable cases for ligation are usually those of large goitres with thick isthmus or considerable fixity, in which the amount of mental excitement and the condition of the heart, as regards acute dilatation and myocardial degeneration, do not preclude the performance of any operation at all. In deciding whether a given case of exophthalmic goitre should be treated by partial thyroidectomy or by ligation, or by no operation at all, electrocardiographic examination of the heart and estimation of the basal metabolic rate are often useful.

In chronic cases that have lasted for years, the mere operative risk is often much less than in early acute cases, but the amount of benefit to be expected from operation at this late stage is naturally much less, since permanent degenerative changes have occurred in heart and other organs.

The whole subject of operations for exophthalmic goitre can scarcely as yet be considered as settled, and there is still much room for difference of opinion. Much depends upon the nature of the case and upon the individual skill and experience of the operator. Two points, however, stand out clearly : (1) The very great benefit which the patient nearly always feels within a very short period after the performance of the operation ; (2) The undoubted fact that all operations for true exophthalmic goitre involve more risk to life than do those for most other forms of goitre.

4. **Malignancy.**—In its earliest stages, while the growth is still confined within the capsule of the gland, there are no means by which a certain diagnosis of malignant disease can be made. When, however, in the thyroid gland of a person over forty, a tumour appears which is hard, which steadily and rapidly increases in size, and which is not of an inflammatory nature, the malignancy of such a tumour should be strongly suspected. If, moreover, the surface of the tumour is irregular and bossy, and if there is likewise dysphagia and pain in the neck, shooting up to the side of the head or to the shoulder, then the diagnosis becomes almost a certainty. A little later, when the growth has penetrated the capsule of the gland, and begun to involve surrounding structures, various other signs appear. Such are paralysis of the recurrent laryngeal nerve, or of the sympathetic, marked dysphagia, affection of glands in the neck, fixity of the tumour to the trachea, etc. The diagnosis then becomes much less difficult, but the prospect of cure by operation has by this time become very slender. Unfortunately it is at this late stage of the case that the patient is usually first seen by the operating surgeon.

The tumour at a comparatively early stage, and often while the patient's general health is still quite good, is very apt to penetrate the inner part of the glandular capsule and to become firmly incorporated with the trachea. This involvement of the trachea, which renders a curative operation well-nigh hopeless, must be strongly suspected when it is found that the tumour cannot be moved *upon the trachea* but only moves with it. *Plate XLI, B*, shows well this early involvement of the trachea. Although the malignant tumour has caused but very little enlargement of the thyroid gland, it is not only firmly incorporated with the trachea, but has already actually invaded its lumen and projects into it, a very common condition.

Differential Diagnosis of Malignant Disease.—The conditions which are common in middle-aged and elderly people and are most likely to simulate malignant disease and to lead to errors in diagnosis, are :—

The development of a deeply-seated *cyst*, which may be of considerable hardness and may enlarge somewhat rapidly.

Fibrotic and calcified masses in a goitre of long standing, to which the patient has paid little or no attention, and of the very existence of which he may be quite unaware.

The absence of any reliable history may cause great difficulty in the diagnosis of malignant disease ; but the cyst, even if hard, generally has a smoothness and globularity which is not found in the case of a malignant tumour. The calcified mass often has a definition and a stony hardness which are not usually present even in the hardest malignant tumours.

The softer forms of sarcoma will occasionally be simulated by the rare *acute or subacute inflammation.*

More common is the hardness and swelling of the thyroid gland which occurs not infrequently, especially in women at and after the *menopause*, and which is sometimes the precursor of myxœdema. The uniform involvement of the whole gland, the absence of any evidence of infiltration of surrounding parts, even when the enlargement has attained a considerable size, will generally help in the diagnosis. The tiny hard cysts which may sometimes be felt on the surface of such glands must not be mistaken for the coarser bossiness of a malignant tumour.

There are exceptional forms of malignant disease, such as the papilliferous carcinoma and some forms of endothelioma, in which the progress of the disease is much less rapid, and in which removal by operation, even in the case of large tumours, is much more likely to be attended by a favourable result. But they are not sufficiently common to be discussed fully in this short article.

OPERATIVE MEASURES.

Most of the operations for the removal of goitre fall into one or other of two classes, **Extirpation** or **Enucleation**. By extirpation is meant removal of some portion of the gland, generally one lateral lobe, together with its glandular capsule. By enucleation is meant the removal of an encapsuled tumour (cystic or solid) from within the gland substance in which it lies buried.

In both operations an incision is made sufficiently long to give free access to the gland. It is usually made transversely and slightly curved, a large flap of skin and platysma being turned upwards. The infrahyoid muscles are separated in the middle line and retracted, or if necessary partially or wholly divided at the upper end. In the extirpation operation all principal arteries and veins are now tied just outside the capsule. These are the superior thyroid artery and vein, and middle and inferior thyroid veins. The inferior thyroid artery can be dealt with either by ligation of its main trunk outside the inferior laryngeal nerve, or by clamping its branches inside the line of that nerve. Both these procedures require that the gland shall be lifted up and turned inwards. If it is difficult or inadvisable to do this, the branches of the inferior thyroid artery may be secured by cutting through the isthmus, and then cutting backwards and outwards through the lobe near the trachea, picking up and tying the branches as they are met with. Great care must be taken to avoid the recurrent laryngeal nerve (*Plate XLIV*). All bleeding points,

PLATE XLIV.

THYROID SURGERY—*continued*

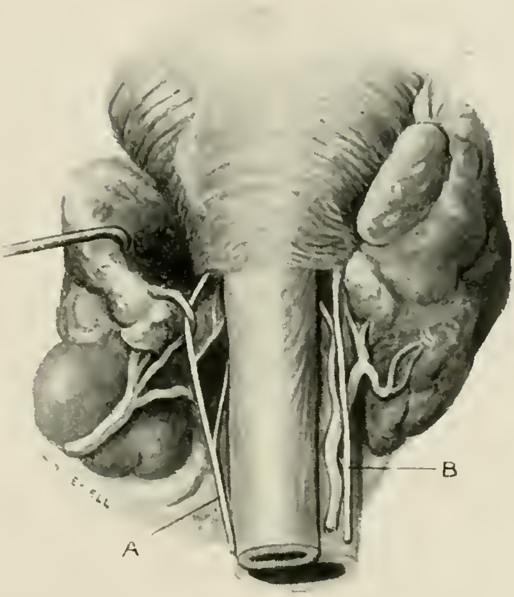


Fig. A.—Dissection showing recurrent laryngeal nerve and inferior thyroid artery seen from behind. On right side the close proximity of the nerve (B) to gland is shown. The left side shows how pulling gland forwards may displace the nerve (A) and render it more liable to injury during an operation.

(*St. Thomas's Hosp. Anat. Dept. Dissected by Prof. F. G. Parsons.*)

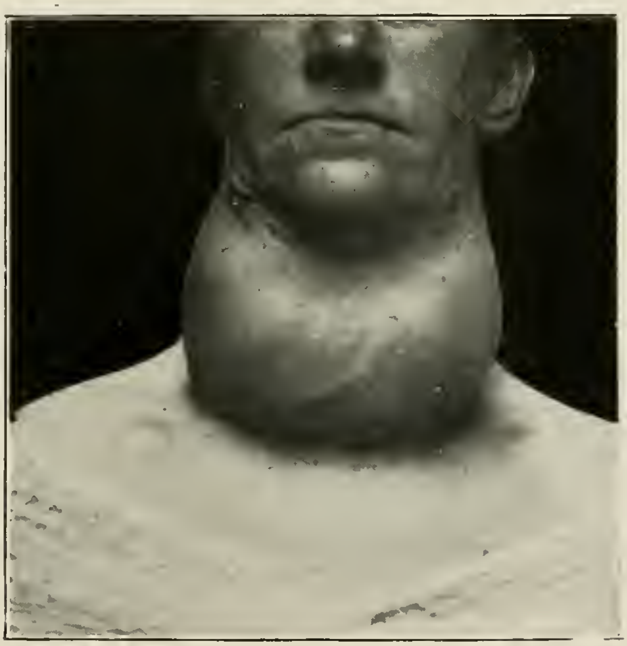
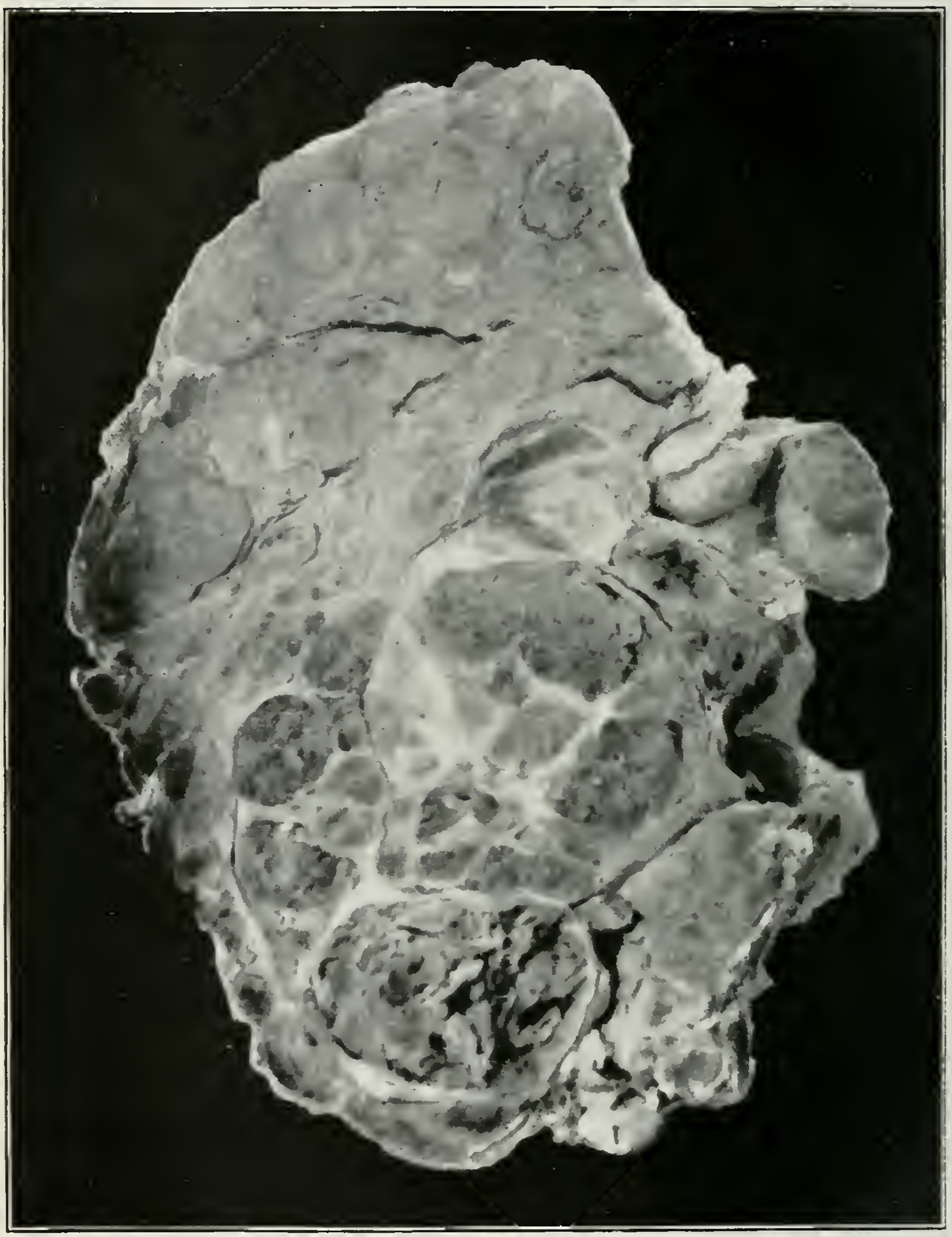


Fig. B.—Late stage of parenchymatous goitre, 30 years' duration, F., age 47. Treated by bilateral resection-extirpation of nine-tenths of R. lobe, three-quarters of L. Weight 22 oz.



Section of one of the masses removed from case seen in *Plate XLIV, Fig. B*, showing much fibrosis and some adenomata. (× 1.)

Roy. Free Hosp. Mus.

PLATE XLVI.

THYROID SURGERY—*continued*

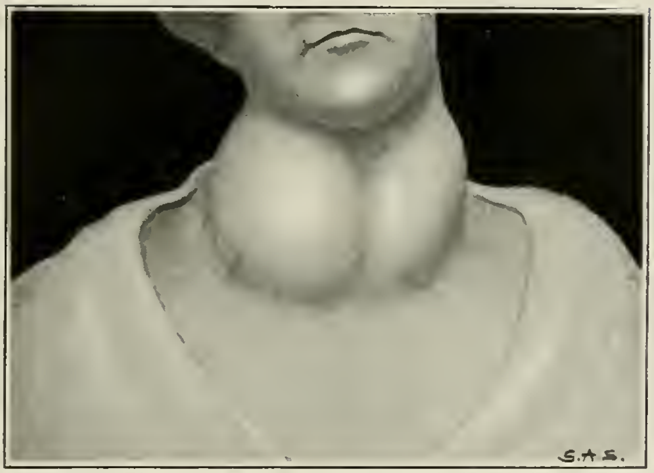


Fig. A.—Adenoparenchymatous goitre, 28 years' duration. Bilateral resection-extirpation, for bulk, deformity, and dyspnœa. F., age 48. Weight 19 oz.
(Drawing from photograph.)

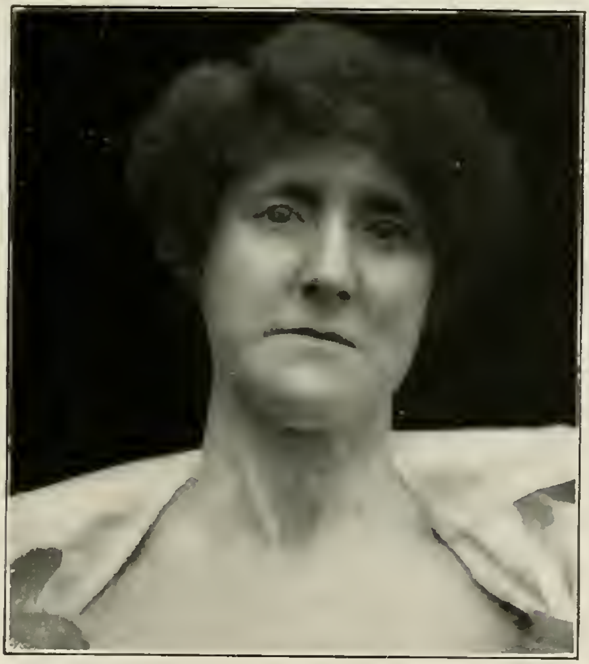
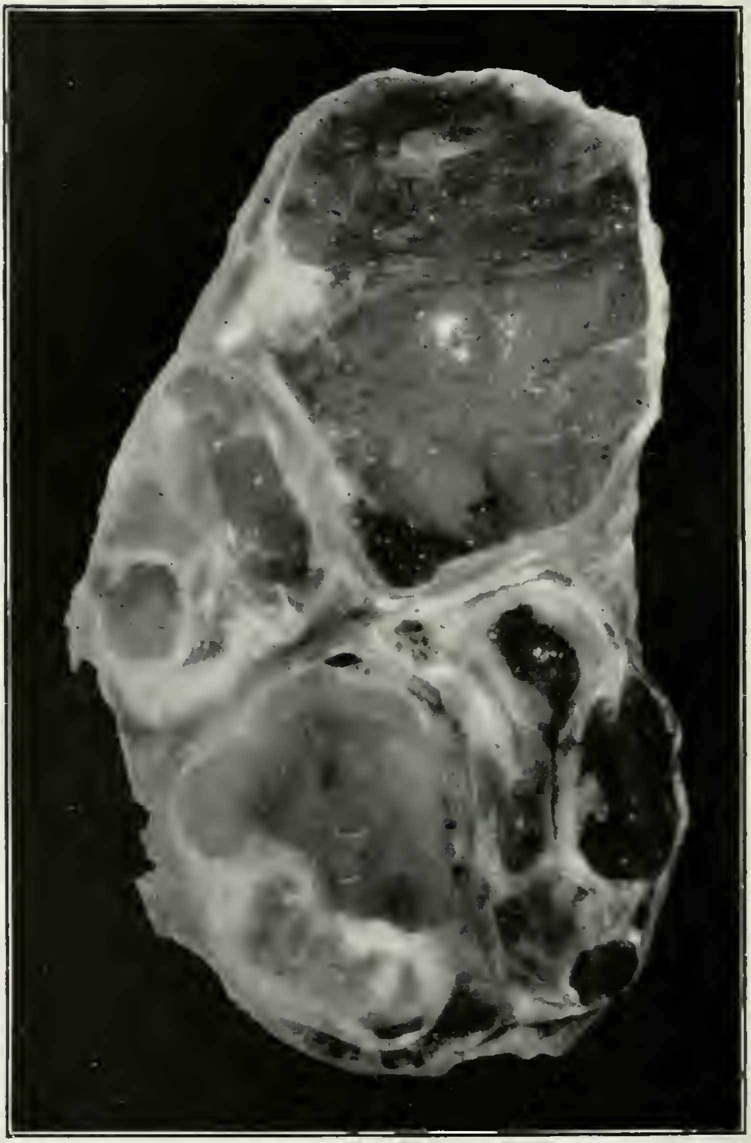


Fig. B.—The preceding, one year after operation.



Section through right lobe of patient shown in *Plate XLVI, Fig. A*, showing much old fibrosis. (× 1.)

Roy. Free Hosp. Mus. No. Ea Cg. 9010*s*.

however small, must be carefully secured by ligature before the wound is closed. It is generally safer to drain the wound for twenty-four hours.

In the enucleation operation, when the gland has been exposed, it is incised and the encapsuled tumour shelled out from within it with blunt instruments. As bleeding from the gland in this operation may be severe and even dangerous, the pure enucleation operation is now seldom performed, its place being taken by resection-enucleation (*Plate XLIII*). In this operation much of the thinned glandular capsule is removed with the tumour, the size of the wound in the gland being thus greatly diminished. Enucleation should never be attempted in any case but that of a well-encapsuled intraglandular tumour.

In neither class of operation should the hilus, the inner and back part of the gland close to the trachea and recurrent nerve, be removed except in cases of malignant disease.

In actual practice the operator will vary his procedure according to the nature of the case with which he is dealing, and many of his operations will be modifications or combinations of the two principal methods.

Other operative procedures not involving actual removal of gland substance are ligation of the superior thyroid artery, an excellent and fairly easy operation for certain severe cases of exophthalmic goitre in which the larger operation of partial thyroidectomy is too dangerous to be admissible. Ligation of the inferior thyroid artery, on the other hand, is a difficult operation which presents little if any advantage over partial thyroidectomy. The injection of boiling water into the gland is an operation which has its advocates, chiefly in America, but has not found much favour in this country. The removal of part of the thymus gland, which has of late years been recommended for exophthalmic goitre, either conjointly with, or as a substitute for, partial thyroidectomy, can hardly be considered as yet to be an operation of proved value. Operations upon the sympathetic nerve for exophthalmic goitre, and division of the thyroid isthmus for dyspnœa, have deservedly fallen into disuse.

Complications During or After Operation.

Anæsthesia.—The dangers of a general anæsthetic for many goitre operations are well known, but can be avoided in most cases if the anæsthetist is familiar with this class of surgery. For some cases of goitre with extreme dyspnœa, and for some exophthalmic goitres, local anæsthesia is to be preferred.

General anæsthesia should never be deep in any goitre operation. Ether given by the open method is the anæsthetic of choice, although the administration of ether by the intratracheal method, or by the rectum, have their advocates. Both methods, however, have special dangers and disadvantages of their own.

Hæmorrhage may be a serious complication unless the operator is thoroughly familiar with the position in which the main vessels are likely to be found, and secures them by clamp or ligature before they are divided. Venous hæmorrhage is much more to be feared than arterial, since the veins are more numerous; they are often much thinned and distended, and are less constant in their position than are the arteries.

Wounds of surrounding structures such as the recurrent nerve (*Plate XLIV*), internal jugular vein, trachea, and œsophagus, should be avoided by keeping close to the gland, and by bearing in mind not only the normal anatomical relations of these organs, but also that any or all of them may be considerably displaced by the goitre.

Tracheal collapse, during or shortly after operation, is a real danger in certain cases of extreme dyspnœa. It is especially apt to occur in cases of severe bilateral compression of the trachea. When one lobe of the gland has been removed, the remaining lobe may push the already flattened and narrowed trachea over to the opposite side and thus cause fatal occlusion from kinking. To avoid this it may be imperative that some of the second lobe should be removed before the wound is closed. Tracheotomy should never be performed if it can possibly be avoided, as it adds greatly to the risk of operation. It is hardly ever necessary in any case of non-malignant goitre.

Septic complications, such as bronchitis, pneumonia, and mediastinitis, formerly the bugbear of thyroid surgeons, can be avoided by strict attention to asepsis together with the avoidance of undue hæmorrhage.

Myxœdema and *tetany*, both common after complete removal of the thyroid —which should never be performed—may be avoided by taking care not to remove too much of the gland. Many, perhaps most, surgeons believe that tetany is produced by removal of the parathyroids, but the evidence in favour of this view is by no means convincing.

TICK FEVER. (*See* Relapsing Fever.)

TONSILS, DISEASES OF. (*See also* Radiotherapy.)

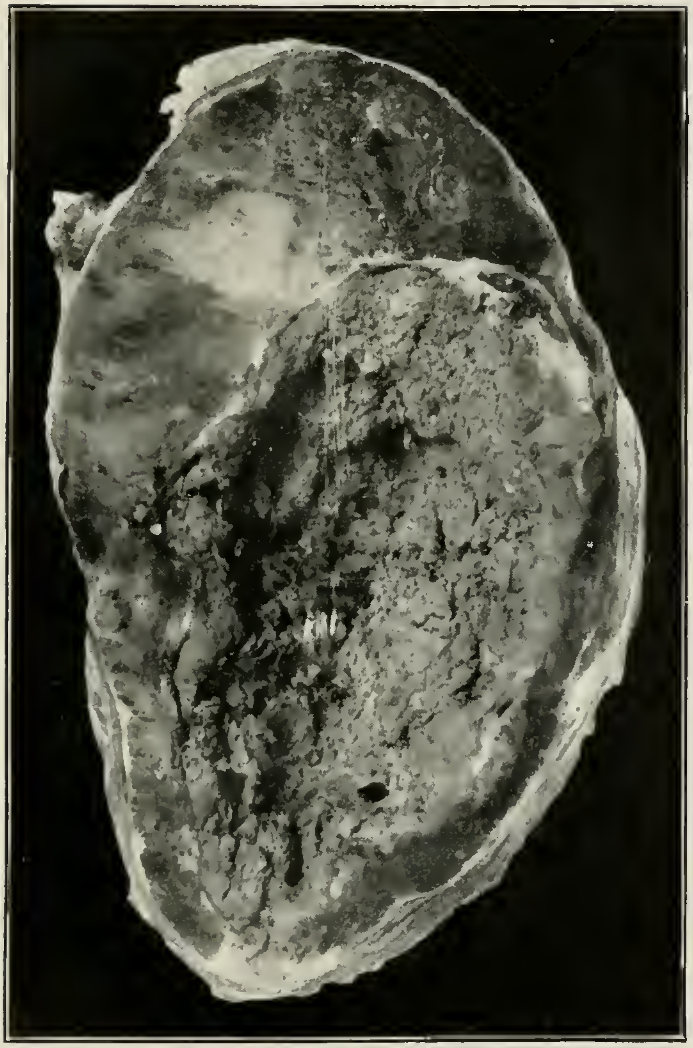
A. J. M. Wright, M.B., F.R.C.S.

Much has been written as to the possible functions of the tonsils and other subepithelial glands, and the possibility of any damage resulting to the human organism as a result of their removal. There is some slight evidence that the removal of these tissues in childhood may diminish resistance to general infections, while on the other hand there is overwhelming evidence that in cases in which disease of these structures is giving rise to symptoms their removal is highly beneficial. Unfortunately there is, at present, no certain method of deciding in every case for and against operation. Logan Turner,[1] critically considering this question, comes to the conclusion that the tonsils are both a protection and a menace. A large ingestion of bacteria is continually going on through the tonsils, possibly accompanied by an immunization of the body against their invasion. On the other hand, it is becoming generally recognized that the tonsils may become the seat of local mischief and constitute one of the portals of entry of systemic infection. That the tonsils, in addition to acting as a portal of entry to the system for the tubercle bacillus, do also occasionally become themselves affected has long been recognized. Weller[2] has conducted a routine histological examination of the tonsils from the large number of 9000 cases. The incidence of an active tuberculosis in the tonsil was found to be 2·35 per cent. The groups of cases showing the highest incidence were the dwellers in institutions and hospitals. Histologically three types were noted—focal crypt infections, ulcerative lupus-like lesions, and diffuse miliary tuberculosis. The two former types are usually unilateral and probably infections from the surface, while the latter is a hæmatogenous infection.

The fact that **X Rays** are known to have a selective action on lymphoid tissue has led to their employment as an alternative to removal of the tonsils. Murphy[3] and others have employed this method in 46 cases. One exposure only was given, the ray entering behind the angle of the jaw, and the dose corresponding to from 1 to 1¾ skin units. In all but 4 cases a marked shrinkage of the tonsils was noticed after a period of two weeks, and it was found that, where the *Streptococcus hæmolyticus* was present on culture before the application, it was absent a few weeks afterwards. An attempt was also made to treat adenoids, where present, the ray being introduced through the back of the neck. The results were not so satisfactory, probably owing to the stoppage of the rays by the vertebræ.

PLATE XLVIII.

THYROID SURGERY—*continued*



Section through left lobe of patient shown in *Plate XLVI, Fig. A*, showing a large cavity which contains broken-down blood-clot and colloid. (× 1.)

Roy. Free Hosp Mus. No. Ea Cg, 9010*s*.

Hays[1] and others have experimented with **Vaccines** as an alternative to the removal of the tonsils when systemic disease has been due to a tonsillar infection. No figures are given, but they conclude that tonsillectomy is a better procedure than the administration of vaccines unless operation is contra-indicated.

REFERENCES.—[1]*Jour. Laryngol. and Otol.* 1921, Feb., 80; [2]*Arch. of Internal Med.* 1921, June, 631; [3]*Jour. Amer. Med. Assoc.* 1921, Ja ., 228; [4]*Med. Record,* 1921, Feb., 300.

TRACHEA, FOREIGN BODIES IN. (*See* ENDOSCOPY, PERORAL.)

TRACHEOTOMY. (*See* LARYNX, AFFECTIONS OF.)

TRACHOMA.

Lt.-Col. A. E. J. Lister, I.M.S.

A. F. Macallan,[1] whose vast experience of trachoma in Egypt is well known. regards the following signs as definitely pathognomonic of trachoma: (1) Trachoma *Stage I*, follicles; or trachoma *Stage II*, follicles on conjunctiva of tarsus or of retrotarsal folds. (2) Cicatrization of conjunctiva on tarsus without or with trichiasis entropion. (3) Pannus follicles at limbus, especially at the upper third of the circumference of the cornea: these may be single or multiple or ridge-like. (4) Peripheral pits, especially at the upper third of the circumference of the cornea due to cicatrization of ridge-like pannus follicles. (6) Pannus vessels, especially at the upper third of the circumference of the cornea. In the absence of these signs the case must not be diagnosed as trachoma.

He says that the incubation period of trachoma is four days, and the patient can disseminate trachoma after this time, though he cannot be diagnosed as trachomatous. The diagnosis of follicular conjunctivitis, he remarks, now becomes easy. In this condition there is a chain of follicles on the conjunctiva of the lower lid, unaccompanied by any of the above-mentioned signs of trachoma. [*Stage I* and *Stage II* merely refer to a useful classification of the stages of trachoma, introduced by Macallan and described in his book on trachoma.—A. E. J. L.]

Seddek[2] advises, for *fleshy pannus* which resists ordinary treatment, Heisrath's combined **Excision** of the tarsus and conjunctiva, and in severe cases, **Scraping** of the pannus tissue from the surface of the cornea. He argues that the disease is "but a shadow of active trachoma of the palpebral conjunctiva, thrown on to the cornea and neighbouring conjunctiva; why not treat them both on the same principles?" He found the resulting cicatrix a less dense barrier to light than the pannus itself. After treatment, an instillation of atropine, the use of 1–5000 sublimate lotion, with daily painting of 2 per cent silver nitrate, then 1 per cent perchloride of mercury, and lastly copper sulphate, is required. The vision was markedly improved. Others testify to the good effects of scraping, and it is said that this has been the only treatment for fleshy pannus in use at the Kasr-el-Aini Hospital for many years

McMullen[3] says it may be impossible to differentiate between follicular catarrh and trachoma in the early stages, and that the case must be kept under observation and treated as suspected trachoma till the diagnosis is clear. He points out that the follicles of follicular conjunctivitis appear to be *on* rather than *in* the conjunctiva. . . . The follicles of follicular conjunctivitis are confined to the fornices; they are never seen on the plica or bulbar conjunctiva. If the follicles are irregularly present and not disposed in parallel rows, and especially if they are deeply set, and beginning induration of the tarsus is evident, the presence of trachoma is more than a suspicion. He mentions that Steven has pointed out that a loupe investigation of the upper cornea will often detect a very delicate ingrowth of vessels, the first beginning of pannus, not discoverable to the naked-eye examination. This is not present if the follicles are benign.

[We would call attention to the fact that, in our experience, treatment intended for non-trachomatous conditions may keep in abeyance the follicles and the lid changes of trachoma in exceptional cases. The pannus vessels may be much smaller than usual and the infiltration of the cornea considerable, giving rise to a condition which may be mistaken for keratitis by the unwary. We saw one such case recently. It was that of a military medical officer who had apparently contracted the disease in Egypt. The right eye only was affected. He had been under treatment at various places for about a year, with steady loss of vision. The vision was reduced to $\frac{6}{60}$. On careful inspection with a loupe, two or three minute follicles were seen in the substance of the tarsus. The condition rapidly cleared up when **Copper Sulphate,** and later, **Massage** with **Yellow Oxide of Mercury Ointment,** was used; he recovered with $\frac{6}{6}$ vision ultimately. Patients in India where conjunctivitis is common, who live remote from efficient medical aid, often treat themselves with protargol or similar remedies for long periods, in a way that would not occur in Europe. Such a case as I have mentioned, therefore, is worth bearing in mind, in dealing with patients from abroad.—A. E. J. L.]

H. Kirkpatrick[4] recommends ballooning up the fornix to expose fully the affected parts in trachoma, by a subconjunctival injection of **Normal Saline,** to which has been added 4 min. of a 4 per cent solution of **Cocaine** and 4 min. of **Adrenalin.** The appropriate treatment can then be readily applied. He advises the use of **Scarlet Red,** 2 per cent in olive oil, for ulceration in the third stage.

S. Fernandez[5] does not think trachoma is curable, but rather that the remarkable cases of cures published, of which he has seen several, are not cases of true trachoma.

References.—[1]*Bull. Soc. d'Ophtalmol. d'Egypte,* 1920; [2]*Ibid.*; [3]*Jour. Amer. Med. Assoc.* 1920, 1109; [4]*Lancet,* 1921, i, 1303; [5]*Rev. Cubana de Oftal.* (abstr. *Rev. gén. d'Ophtalmol.* 1920, 518).

TROPICAL ULCER.

Sir Leonard Rogers, M.D., F.R.C.P., F.R.S.

N. Crichlow[1] has treated cases of tropical ulcer successfully in the Solomon Islands by one intravenous injection of **Galyl,** soaking in a hot antiseptic solution 15 to 30 minutes, and dusting with iodoform. Ulcers which had resisted treatment for months before healed in two to four weeks. R. Howard[2] thoroughly scrapes tropical ulcers with a Volkmann spoon, cuts away overhanging edges under an anæsthetic, and dresses with cyanide gauze. If a large surface is left, skin grafting is done when healthy granulations have formed. Rapid healing is thus obtained.

F. C. Ormerod,[3] working in Mesopotamia, found **X Rays** the simplest and best method of treatment of oriental sore, as it penetrated the deeper tissues and destroyed the parasites. Of 130 patients, 84 were completely cured, most of the others having been lost sight of through transfers or leaving hospital before they were well.

References.—[1]*Jour. Trop. Med. and Hygiene,* 1920, 227; [2]*Ibid.* 215; [3]*Lancet,* 1920, ii, 893.

TRYPANOSOMIASIS.

Sir Leonard Rogers, M.D., F.R.C.P., F.R.S.

Etiology and Prophylaxis.—A Conference at Pretoria[1] has discussed the danger of sleeping sickness spreading further south into Zululand and Natal, and decided to continue the prohibition of recruitment of native labour from sleeping-sickness infected areas, to take further measures to prevent such a spread of the disease, and to make a zoological survey of Zululand with special reference to trypanosomiasis. W. Yorke[2] read a highly controversial paper on trypanosomiasis research at the Royal Society of Tropical Medicine, in which he supported Bruce's view that human and some game trypanosomes were probably identical, and advocated further extensive research, and destruction of large game: the ensuing discussion[3] showed great differences of opinion among medical men with African experience. P. W. Bassett-Smith,[4] in a lecture on this subject, gave a historical review, and described his experiments demonstrating that trypanosomes can pass through the placental membrane into the young of infected mother animals.

Treatment.—C. H. Marshall and S. M. Vassallo[5] have reported further on the intrathecal injection of **Salvarsanized Serum** in trypanosomiasis, based on the view that any trypanocidal substances in the blood cannot reach the parasites in the nervous system. Of 33 cases treated six months or more previously, 6 had died, but practically all the others were alive and well in December, 1920, their blood and cerebrospinal fluid giving negative results for trypanosomes. Another 23 cases had been treated less than six months with good results, including some given injections of the patients' own blood-serum without previous injections of salvarsan. It is thus claimed that a single intraspinal injection of 20 min. of the serum has cleared both the central nervous system and the blood and glands of trypanosomes. G. C. Low, in the discussion, warned against accepting any of the cases as cured after so short a time, and was unable to see how such a treatment could be effective, while P. Manson-Bahr mentioned a case of his in which it had failed.

J. W. H. Eyre and C. H. Marshall[6] record full notes of a European treated by Marshall's method with complete recovery of his health, and reply to criticisms. W. Yorke[7] severely criticizes both the assumptions on which the treatment of Marshall and Vassallo is based and the inadequacy of their results. Their treatment is not new, and has already failed in the hands of others, while no satisfactory evidence has been produced that salvarsanized serum intrathecally is able to sterilize infected cerebrospinal fluid, and the results so far published are not better than those hitherto obtained by other methods.

Fever due to a Flagellate.—M. Leger,[8] working in Brazil, describes a case of fever in which he found scanty flagellate protozoa in a blood-film taken during life and in the smears of the liver pulp after death, but none in the spleen, Clinically fever occurred repeatedly for two to four days with intervals of freedom of four to five weeks, and leucocytosis, 16,000 white cells, with 46 per cent of polynuclears, 50 per cent of lymphocytes, and 3 per cent of large mononuclears. The parasites closely resembled herpetomonads, but with the blepharoplast behind the nucleus and a free flagellum, which could not be traced back to the blepharoplast except in one instance. He considers it to be a new species, and suggests the name *Trypanopsis maligna.*

References.—[1]*S. African Med. Jour.* 1920, 348; [2]*Lancet,* 1920, ii, 900; [3]*Ibid.* 1141; [4]*Jour. Trop. Med. and Hygiene,* 1921, 105; [5]*Trans. Roy. Soc. Trop. Med. and Hygiene,* 1921, xv, and *Lancet,* 1921, i, 1185; [6]*Brit. Med. Jour,* 1921, ii, 284; [7]*Bull. Trop. Dis.* 1921, 18, 155; [8]*Jour. Trop. Med. and Hygiene,* 1921, 54.

TUBERCULOSIS IN THE BLADDER. (*See* Bladder, Diseases of.)

TUBERCULOSIS, INTESTINAL. (*See* Intestine, Small, Surgery of.)

TUBERCULOSIS OF THE KIDNEY. (*See* Kidney, Surgery of.)

TUBERCULOSIS, PULMONARY. (*See also* INFECTIOUS DISEASES PREVENTION ; RADIOTHERAPY.)

Arthur Latham, M.D., F.R.C.P.

Associated Lung and Joint Tuberculosis.—A. Jacquemin[1] is physician at a hospital to which are sent mixed cases of tuberculosis of both lungs and joints. He discovered that the prognosis depends on which process began first, as the second process acts like a derivation or a fixation abscess, diverting the disease to this second point. When this second process occurs in the lungs, these vital organs soon become compromised ; but when the process of derivation is on a limb, it does comparatively little harm, and this second process should be encouraged rather than suppressed. Hence the prognosis is comparatively favourable when the bone or joint process has developed secondarily to the pulmonary process. He cites a number of instances of each type, and also some cases to show the disastrous results when a secondary bone or joint process was operated on and cured, thus depriving the primary lung process of this outlet. On the other hand, benefit resulted when a primary bone or joint process was operated on and cured, the necessity for the lung's sacrificing itself thus being done away with.

The Metabolism in Tuberculosis.—McCann and Barr[2] have investigated this subject, and point to the fact that the food requirements of tuberculous patients are not large, either as regards total energy value or nitrogen content ; forced feeding, therefore, is unnecessary, and is probably harmful in the active stages of pulmonary disease. Since protein increases the respiratory exchange in the tuberculous as in normal people, it may be well to limit the protein intake during periods of activity (of the disease), in order to put the lungs at rest. They summarize their conclusions as follows :—

1. The basal metabolism of tuberculous patients may be normal, or very slightly above that of normal men of the same size. Thus, in 10 cases, the variation from average normal was from − 3 to + 15 per cent.

2. Further increases in metabolism occur with a rise of body temperature. These increases are not large. Thus, one case was given in which the temperature rose 1° C. during two hours without a chill. The heat production of the second hour was only two calories greater than that of the first hour. With a rectal temperature of 104° F. (40° C.), the metabolism may be 30 per cent above the average normal.

3. The basal heat production in tuberculosis may be less than the normal for the same patient when in health ; in other words, the loss in weight may be accompanied by a reduction in metabolism which more than compensates for the tendency to increase caused by the disease.

4. Limited data regarding the nitrogen excretion show that, while a toxic destruction of protein does exist in tuberculosis, it is not large. The urinary nitrogen may be reduced from 5 to 6 grm. per diem, though nitrogen balance may be attained only at a higher level (about 10 grm. a day).

5. The specific dynamic rise in metabolism produced in two cases by the ingestion of a protein meal corresponded closely with that produced by the same meal in three normal men.

Masked Juvenile Tuberculosis.—J. V. Cooke and T. C. Hempelmann[3] state that masked juvenile tuberculosis presents a sufficiently distinctive clinical type to deserve a prominent place in the category of tuberculous affections in childhood. The characteristic clinical picture consists of : (1) A history of frequent coughs and colds, with or without known exposure to tuberculosis ; (2) Attacks of unexplained fever, often with afternoon elevations ; (3) Anorexia ; (4) Loss of weight ; and (5) Asthenia. On physical examination, there is found more or less malnutrition, occasionally anæmia, and chest signs referable to enlarged tracheobronchial nodes. In certain instances there may be, in addition, phlyctenular disease or skin tuberculides. The von Pirquet or intracutaneous tuberculin tests are positive, and in those over four years of age three-fourths of the children give a positive complement-fixation test for tuberculosis. The chest findings may be verified by the use of the Röntgen ray, which not infrequently reveals unsuspected lesions of varying size and age in the lung parenchyma as well. The diagnosis must rest on a review of all the findings; the authors emphasize the value of the complement-fixation test in calling attention to this class of cases.

The Blood-pressure in Pulmonary Tuberculosis.—A number of examinations of the blood-pressure in phthisis have been summarized in *Medical Science.*[1] From a study of more than 700 cases of pulmonary tuberculosis, Marfan and Vannieuwenhuyse found that the systolic pressure was usually lowered. As a general rule the fall was all the more pronounced the more serious the case, and increased as the disease grew worse. In some cases, however, the systolic pressure was persistently normal, or even raised. In these cases the disease was usually favourable, its course being either very slow or not progressive at all. While a normal or high blood-pressure was as a rule a good prognostic, a low tension did not exclude the possibility of improvement and even of clinical recovery, provided the fall was not too low. But while a favourable course was the rule in tuberculous patients with a normal or raised blood-pressure, in patients with low tension it was the exception. The writers insist that no conclusion can be drawn from a single measurement of the blood-pressure, and that the results can only be taken into account when the measurements have been repeated several times, at more or less long intervals, and under the same conditions. The diastolic pressure generally remains within the normal, and only falls in the last stage; from a practical standpoint its determination is of less importance than that of the systolic blood-pressure.

Dr. Bloeme examined the blood-pressure by the auscultatory method with Riva-Rocci's instrument in 500 cases of pulmonary tuberculosis, and came to the following conclusions with regard to the diagnostic and prognostic value of **Sphygmomanometry** in this disease. Cases with a systolic blood-pressure of 80 to 100 mm. Hg could be recognized by other diagnostic methods, and the estimation of the blood-pressure was merely confirmatory of other findings. Cases of this kind under the writer's observation died within 6 to 12 months, with the exception of a few patients who showed a reading of 90 to 100 mm. without any constitutional symptoms and were probably examples of essential hypotonus. The most important group consisted of men who had a blood-pressure of 100 to 110 mm., as in such cases the seriousness of the condition was more easily recognized by sphygmomanometry than by any other method. The most favourable cases were the patients of both sexes who had a blood-pressure of 110 to 150 mm. As regards individual cases, the writer found that a patient with a low blood-pressure was more liable to a relapse than a patient with a normal reading, in spite of apparent improvement shown by increase in weight, diminution in the amount of sputum, and a normal temperature and pulse. Patients with a relapse showed a low blood-pressure even after the general and local symptoms had subsided. When considerable improvement took place, the blood-pressure rose. A definite fall of blood-pressure in an apparently slowly progressive case indicated a more unfavourable course than might otherwise be supposed.

Steven examined the blood-pressure of a large number of patients with surgical tuberculosis during heliotherapy, and found that in almost all there was a fall of 10 to 20 mm. Hg during the treatment. In most cases the pressure fell directly after the beginning of the treatment, and remained at more or less the same level during the following hours. In the evening it returned to its usual height or slightly exceeded it. The fall of blood-pressure was readily explained by the hyperæmia of the skin caused by the sun's rays, with subsequent reduction of the pressure in the internal vessels. It was also conceivable that the vascular system as a whole was affected, and that a reduction of tension took place from the vasomotor centre. As a rule the fall of blood-pressure was accompanied by an increased pulse-frequency. Steven therefore recommends that heliotherapy should be employed with caution in a patient whose heart possesses little reserve power.

Naucler's contribution to the study of the blood-pressure in pulmonary tuberculosis includes an exhaustive review of the literature, and original work carried out in a hospital 40 metres above sea-level. The measurements were made during the patients' rest hour, between 3.0 and 4.0 p.m., in the recumbent position. The Riva-Rocci-Recklinghausen apparatus was used, with a 13-cm.-wide cuff embracing the middle of the forearm, held at the level of the heart. The systolic as well as the diastolic pressure was measured according to Korotkov's method. The number of the patients was: 65 men, 44 women, and 90 children between the ages six and fifteen. Although there were considerable individual differences, the average blood-pressure was highest in the early stages of the disease, lowest in the last stages. In 60 per cent of the patients in Turban's first class, the pressure was below normal. There were therefore several early cases in which the pressure was normal or higher, and a low pressure cannot accordingly be accepted as a reliable sign of early phthisis. The pressure was more dependent on the severity than on the extent of the disease, and the lowest pressures (80 to 89 mm. of mercury) were noted in moribund cases. The fall of pressure was often most abrupt when, at the first measurement, it was fairly high. The fall was less steep when the pressure was already low. The pressures were highest in cases gaining weight, lowest in cases losing weight; the height of the pressure was directly proportional to the severity of a reaction to an intracutaneous injection of tuberculin. A definite relationship was also established between both the frequency and the severity of hæmoptysis, and the height of the blood-pressure.

Diagnosis.—

The Complement-fixation Test in Tuberculosis.—A. L. Punch[5] concludes:—

1. That in the complement-fixation test we have a specific means of diagnosis of the presence of an active or recently active tuberculous lesion.

2. That a negative reaction is as reliable an indication of the absence of such a lesion as a positive reaction is of its presence.

3. That a positive reaction in the highest dilution only of complement is just as reliable an indication of the presence of such a lesion as a positive reaction in all three dilutions.

Pritchard and Roderick[6] investigated the complement-fixation test for tuberculosis in 466 cases, 220 of which were pulmonary tuberculosis, including suspects, 13 extra-pulmonary tuberculosis, and 233 non-tuberculous; and have come to the following conclusions:—

1. The reaction does not give such valuable and constant information as the Wassermann reaction in regard to syphilis.

2. In some open advanced cases of pulmonary tuberculosis no reaction occurred: this the writers attribute to the cells having lost their power of reaction owing to prolonged saturation with specific toxins.

3. The test is of the greatest help in differential diagnosis. It also acted as a stimulus to more careful clinical observations (cf. *Medical Science*, 1920, 2, 237, 282).

Watkins and Boynton[7] make the following deductions:—

The Miller antigen is serviceable, practical, and efficient for the complement-fixation test in tuberculosis. The reaction is specific for tuberculosis, and, when positive, should be interpreted as indicating tuberculosis of some degree of activity. When the Wassermann and tuberculosis fixation reactions are both positive, they should be interpreted without relation to each other.

The positive fixation reaction can be interpreted as indicating tuberculosis, either active at the time, or recently active. The focus may or may not be of clinical significance, which fact must be determined by other means. The negative fixation reaction indicates either absence of infection; excessive activity of the disease, exhausting the antibody; or arrest of the disease, with spontaneous disappearance of antibody no longer required.

TREATMENT.—

Hæmoptysis.—K. Zehner[8] declares that **Camphorated Oil** must be regarded as the sovereign means to arrest profuse hæmorrhage from the lungs. He theorizes to explain its action as mechanical and dynamic, in both stasis and perforation hæmoptysis. Volland has been very successful with subcutaneous injection of from 25 to 30 grm. of 10 per cent camphorated oil. Zehner gives moderate doses of the 20 per cent, and has scarcely ever known it to fail.

So far from accepting Bang's teaching, that **Immobilization** and **Morphine** are unnecessary and even harmful, I. Rosenthal[9] cleaves to the tradition of absolute rest in bed, with morphine, **Ice-bags,** and other time-honoured remedies. In support of this standpoint, he shows that the average duration of the hæmorrhages among his cases was considerably less than that among Bang's cases; between 40 and 50 per cent of Rosenthal's cases responded rapidly to treatment, the hæmorrhage being completely arrested within four days. Rosenthal has found the action of **Acetas Plumbicus** and **Pulv. Fol. Digitalis** very prompt and reliable; he gives 10 cgrm. of each five times a day for about four or five days, withholding them when nausea is provoked or the hæmorrhage is arrested.

Cauterization of Adhesions.—Jacobæus,[10] in a further paper showing the value of **Cauterization of Adhesions** which limit the possibility of producing satisfactory compression of the lung by pneumothorax treatment, gives the data of 40 cases in which the operation was performed. In 30 the purpose of the operation was attained. Complete or sufficient compression of the lung was obtained in 27 out of 37 cases of adhesions between the apex and chest wall. The aim of the operation was also attained in 3 cases of adhesions to the diaphragm, but in only one of these was sufficient compression of the lung obtained. In 4 of these 30 cases the operation was followed by serous pleurisy or tuberculous empyema, with serious consequences. In 26 out of 40 cases, therefore, a satisfactory pneumothorax was obtained, and the operation was of genuine benefit as far as the immediate facts are concerned. Later results are not yet published.

String and membrane-like adhesions are the best types for the operation. Surface adhesions are also adapted for cauterization to a certain extent, but nothing can be said with certainty in advance as to the prospect of definite success in these cases. In four cases adhesions have been cauterized in two sittings, and it is possible that an extension of this method may be used.

Artificial Pneumothorax.—B. Sachs[11] analyzes the results obtained by twenty-four American observers in 1145 cases of artificial pneumothorax. The degree of compression obtained in individual cases was given in 66 per cent of the total. Of this number, satisfactory compression was obtained in 51·5 per cent; partial in 27 per cent; failure in 21·5 per cent. The immediate results as given in 1108 out of the 1145 cases were as follows:—

Result	Number	Per cent
Failure	162	14·6
Unimproved	203	18·3
Dead	180	16·2
Improved	323	29·2
Quiescent	119	10·8
Apparently arrested (or arrested)	105	9·5
Cured	16	1·4

Sixty-nine, or 6·2 per cent, were working.

A comparison of the results obtained by the American observers with the results recorded in 224 cases by Brauer, Spengler, and Zink, after a period of observation extending from six months to five years, showed that the total percentage of failures, unimprovements, and deaths in the American cases was 49·1, as compared with 42·9 in the Continental cases. It is apparent that with the class of cases selected at present for artificial pneumothorax, the method is either inapplicable or is unproductive of any beneficial effect in almost half of the cases.

The efficacy of artificial pneumothorax treatment can be judged only by the subsequent course, through a long period of years, of a large number of cases. It may be a conservative estimate to say that, with the present technique and the class of cases treated, the percentage of durable results ('arrests' or 'cures') was about 12 per cent, while in more than double this number (29·2 per cent of 1108 cases analyzed) a palliative effect was produced, which was of variable duration. The sum total is a distinct increase of the chances of the advanced case which does not respond to the usual methods of treatment.

Of the 1122 cases reported by twenty-four American observers in the last two years or more, the incidence of various complications occurring in the course of treatment was as follows:—

Pleural effusion	113
Extension of process in opposite lung	58
Bleeding of other lung	7
Pleural shock	26
Gas embolism	3
Spontaneous pneumothorax	10
Bilateral pneumothorax	2
Pyopneumothorax	13
Cardiac dilatation and heart failure	4
Torsion of heart and blood-vessels	1
Total	237

Complications, that is to say, occurred in 21 per cent of the total number of cases.

Extrapleural Thoracoplasty.—P. Bull,[12] after an experience of 37 extrapleural thoracoplasties, makes the following deductions:—

1. In unilateral, or mainly unilateral, pulmonary tuberculosis which is not cured by rational treatment (including pneumothorax), good results can be achieved by means of extrapleural thoracoplasty.

2. The operation should only be performed after conference with the physician treating the patient, who must have had an opportunity, by observation during a considerable period, of forming a thorough opinion of the prognosis in the case concerned.

3. Resection of the ribs should be carried out under local anæsthesia through a paravertebral incision, so that the posterior part of the ribs, from the eleventh—or, in any case, from the tenth—to the first inclusive, can be removed.

4. If a cavity remains, it can be brought to collapse by means of intrathoracic transplantation of fat.

5. It is necessary that practising physicians should acquire knowledge of the indications and results of extrapleural thoracoplasty. One has now no right to withhold the chance of operation from suitable patients.

Results of Surgical Treatment of Pulmonary Tuberculosis.—Quoting from Sauerbruch, T. Naegli[13] states that, of 381 patients operated on, 134, or 35 per cent, have been cured to the extent that for at least a year and a half after the operation they have been free from fever, present negative sputum, and are able to perform their regular daily work. They were for the most part severe cases, resistant to internal dietetic treatment for many years, cases that, on account of large caverns and copious expectoration, were especially dangerous as sources of infection. Naegli reviews the outcome with the various methods of surgical treatment employed in recent years: among others, artificial pneumothorax; extrapleural thoracoplasty, which is to be considered if adhesions make artificial pneumothorax impossible; paravertebral resection (Sauerbruch), which consists of a more or less extensive resection of the first to the eleventh ribs; filling the lung cavities with paraffin (Baer); resection of the cartilage of the uppermost ribs, on the ground that ossification of this cartilage has brought about a narrowing of the upper thorax aperture (Freund); and other methods of less established value. Naegli thinks that the results of surgical treatment of pulmonary tuberculosis (which, of course, is indicated only if other measures have been persistently tried and have failed) have been very gratifying.

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TUBERCULOSIS OF THE SKIN. (*See* SKIN, TUBERCULOSIS OF.)

TUBERCULOSIS, SURGICAL. (*See* ORTHOPÆDIC SURGERY.)

TUBERCULOUS MENINGITIS. (*See* MENINGITIS.)

TYPHOID FEVER. (*See also* PARATYPHOID FEVER.) *J. D. Rolleston, M.D.*

ETIOLOGY.—B. C. Grant[1] reports the case of a laboratory assistant who, while working with a heavy suspension of living *B. typhosus*, sucked about 0·5 c.c. of the culture suspension through the cotton plug into his mouth. He washed his mouth out thoroughly with 50 per cent alcohol, and was at once given 0·5 c.c. of triple typhoid vaccine. He had been vaccinated with the same vaccine fourteen weeks previously. Four days after infection he had a headache and malaise, and on the eighth day headache and weakness. The temperature remained normal, and no further symptoms developed. On the twelfth day after infection, *B. typhosus* was present in the stools, but by the fifteenth day it had disappeared, and was not found subsequently. A blood culture was negative. The case shows that, in certain cases at least, typhoid vaccination will protect even against massive infection.

J. R. Carver[2] reports the case of a chronic typhoid carrier in a woman who had an attack of typhoid fever in 1893, mistaken for influenza, and until her death in 1914 from malignant disease of the stomach and pancreas, infected at least ten persons who lodged with her. It was not determined whether the bacilli were discharged continuously or intermittently. Typhoid bacilli were always present in the stools and in 55 per cent of the specimens of urine, but the specimens were mainly sent for examination after the infecting of the various lodgers. The patient underwent treatment by various drugs, and an autogenous vaccine was employed with temporary benefit, but within two months of leaving the hospital she infected another lodger and the typhoid bacillus was isolated from the fæces. She suffered from numerous attacks of cholecystitis and biliary colic, which possibly caused a fresh discharge of bacilli into the intestine. At the autopsy gall-stones were present, and the typhoid bacillus was obtained from the bile and from the interior of a gall-stone.

Epidemiology.—Sir William Leishman[3] states that the French in their armies on the Western Front in the first sixteen months of the war had 95,809 cases of enteric fever with 11,690 deaths. On the other hand, the British Expeditionary Force within approximately the same period had only 1205 cases of typhoid with 152 deaths, 1331 cases of paratyphoid with 18 deaths, and 153 cases returned as 'enteric group' with no deaths—a total of 2689 cases with 170 deaths.

According to J. R. Harper,[4] in the South African War no less than 57,684 cases of enteric occurred in an army of 557,653 British officers and men, with 8225 deaths, or a case mortality of 14 per cent, while during the recent war not more than 7423 cases occurred in the British armies in France, with a mortality of 3·58 per cent.

The ninth annual report[5] on typhoid in the large cities of the United States shows that typhoid is still decreasing in these cities at a rapid rate. Every group of cities has shared in the decline, and while the rates in the larger cities have been somewhat less than in cities below 200,000 population, the difference seems due to geographic situation rather than to size. The view expressed in the last report (*see* Medical Annual, 1921, p. 485) that the drop in typhoid occurring between 1918 and 1919 was due to immunization in the Army is confirmed by additional evidence. In a number of localities it has been found that whereas before 1919 the male typhoid rate in the age group 20 to 30 was somewhat higher than the female, this relation was reversed in 1919, and the female typhoid rate was much higher than that of the male rate for the corresponding years. The vaccination immunity persisted to a considerable degree in 1920, and, as far as specific data are at hand, shows no signs of disappearing. The general typhoid death-rate seems to corroborate this inference, since the 1920 death-rate fell below that of 1919 in about the same ratio as that of 1918 fell below that of 1917.

Symptoms.—R. P. Garrow[6] maintains that enteric fever (typhoid and paratyphoid) both in the inoculated and uninoculated, far from being the protean disease it is usually reputed to be, is remarkably constant in its clinical manifestations and true to type. Every degree of intensity may exist, from extreme mildness to overwhelming severity. He considers that 'atypical enteric fever' is a myth, in the creation of which two chief factors have operated: (1) The analogy of small-pox, which in the vaccinated is so modified as frequently to be diagnosed as chicken-pox; (2) Lack of co-operation between workers in the ward and the laboratory, and failure to co-ordinate their findings.

According to Larsson,[7] who records a case in an infant of six months, the following forms of *infantile typhoid fever* may be described: (1) General infection without any prominent local symptoms. The fever is usually of shorter duration than in the adult, but is apt to be very irregular. An increased pulse-frequency corresponding to the height of the fever is the rule in infants. Enlargement of the spleen is not always present, and rose spots when they do occur usually appear earlier than in adults and are often very scanty. (2) Abortive forms are specially frequent in breast-fed infants, simulating simple dyspepsia, non-characteristic afebrile diarrhœa, or a simple febrile intestinal catarrh. (3) Typhoid gastro-enteritis, manifested by irregular non-characteristic diarrhœa with signs of general typhoid infection. (4) Meningo-typhoid, either as a purulent meningitis caused by typhoid bacilli, or as a serous meningitis due to typhoid toxins, as in a case described by Larsson. The most frequent complications of infantile typhoid are bronchitis and bronchopneumonia, which often prove fatal. The next most important complication is otitis, which if neglected may lead to secondary meningitis and cerebral abscess. In severe and protracted cases, purulent skin affections such as boils, abscesses, and bed-sores may occur.

Cases of *concurrent typhoid fever and tuberculosis* are reported by E. E. Clovis and G. E. Mills,[8] whose conclusions are as follows: (1) Patients with inactive tuberculosis may have typhoid fever without any detrimental effects on the pulmonary condition, while the general condition may often be benefited. (2) Patients with acute pulmonary tuberculosis may have typhoid fever and recover without a more rapid advance in the pulmonary condition than if they had not had typhoid fever. (3) Pulmonary tuberculosis does not appear to have any effect on the course of typhoid fever. (4) A high-caloric diet is advisable during the height of the disease, and rest in bed should be ordered as a precautionary measure. (5) Prophylactic injections of typhoid vaccine which were given to 62 tuberculous patients caused severe reactions in the active cases only, but had no permanent bad effects.

According to H. H. Scott,[9] although enteric fever in Jamaica is a severe infection with a comparatively high mortality, and malarial infection is also a severe condition in that country, *coincident enteric fever and malaria*, in many instances at least, is remarkably mild in type, and recovery is usually more rapid and complete than in the cases of either affection separately.

N. Svartz and R. Hansen,[10] who report a case in a woman, age 23, state that between 40 and 50 cases have been recorded of *peritonitis caused by propagation* of the inflammation through the intestinal wall without penetration of the infected material into the abdominal cavity. A little less than a third were cases of fibrinous peritonitis, 10 were purulent cases, and the remainder cases of serofibrinous peritonitis. Twenty-five per cent recovered after operation, and in 4 cases the typhoid bacillus was found in the exudate. The writers' patient was operated on for a supposed intestinal perforation on the thirty-fourth day of typhoid fever. Twenty-five days after the first operation a second was done to drain a subphrenic abscess. Death occurred about seven weeks later from bronchopneumonia.

Cases of *typhoid infection localized in the gall-bladder* without any intestinal symptoms have recently been recorded by A. Panayotatou,[11] Fiessinger,[12] and Netter[13] respectively.

According to A. Lemierre and P. N. Deschamps,[14] the *pulmonary localizations* of the typhoid and paratyphoid bacilli may be manifested clinically by symptoms identical with those of miliary tuberculosis or acute caseous phthisis. Even when the existence of enteric fever is confirmed by blood-culture or the serum test, the appearance of pulmonary symptoms may suggest the development of acute tuberculosis. On the other hand, in spite of statements in text-books to the contrary, the occurrence of acute tuberculosis in typhoid fever is exceptional, L. Bernard having found tuberculous lesions in only 2 per cent of his typhoid cases, so that the development of respiratory symptoms in a case of enteric confirmed by laboratory examination should first suggest a localization of the typhoid or paratyphoid bacillus rather than a superadded tuberculous infection. The writers insist on the necessity of laboratory tests in order to obtain a rapid diagnosis in such cases. Tuberculosis can be excluded by the absence of tubercle bacilli or, better still, by the presence of typhoid or paratyphoid bacilli in the sputum, and by a cytological examination of the pleural effusion, which shows endothelial and polymorphonuclear cells.

G. Etienne[15] reports three cases of *phlebitis* which were shown by blood culture or Widal's test to be due in the first case to the typhoid bacillus, in the second to the paratyphoid A bacillus, and in the third to an undetermined paratyphoid organism. In none of the cases were there any other signs of enteric fever.

Weinberg and Françon[16] relate a case of *gas gangrene* of both thighs which occurred on the eighteenth day of a severe attack of typhoid fever. Its development was arrested by anti-gas-gangrene serum, but death took place in three days. Only three other examples of this complication of typhoid fever are on record. In all four cases the patients had been given injections of drugs in the thigh, such as adrenalin, normal saline, sparteine, or musk.

Cutaneous *abscesses* containing typhoid bacilli and occurring in convalescence from typhoid fever have recently been reported by Rathery and Bonnard,[17] Widal,[18] and Damade.[19]

Diagnosis.—A. B. Rosher and G. S. Wilson[20] record a case of a medical woman, age 23, suffering from pyrexia which closely simulated a typhoid course, but which was probably due to infection with *B. enteritidis* of Gaertner. The writers suggest that in view of this case the sera of patients suffering from enteric-like infections should be tested against a more extended series of antigens than are commonly employed. Commenting on this case, J. W. McNee[21] relates a fatal case of infection with Gaertner's bacillus in a man, age 25, in whom death was due to bronchopneumonia.

Prophylactic Inoculation.—Sir William Leishman[3] states that the low incidence of enteric affections in the British Expeditionary Force in France was undoubtedly largely consequent on the care and thoroughness with which the general measures relating to drinking water, food protection, flies, and a host of other details was carried out, and it would be invidious to attempt to assess the respective shares in the credit attributable to general sanitation on the one hand and preventive inoculation on the other. About 25 to 30 per cent of the original expeditionary force was inoculated before they crossed the channel, and it was not long before the inoculation strength of British troops in France ranged between 90 and 98 per cent.

P. W. Bassett-Smith,[22] as in past years (*see* Medical Annual, 1919, p. 453; 1921, p. 484) makes a report on antityphoid inoculation in the Royal Navy. From October 1, 1919, to September 30, 1920, 13,343 men were vaccinated, 4045 being given one inoculation and 9298 two inoculations. During the year the total number of enteric cases was 66, the incidence being as follows: 53 typhoid, 4 paratyphoid A, 7 paratyphoid B, 2 paratyphoid C. There were four deaths, of which two were from typhoid in men inoculated twice, one from paratyphoid B in a man who had not been inoculated, and one from paratyphoid C in a man who had been inoculated with T.A.B. vaccine. As cases of irregular enteric which had been traced to infection with paratyphoid C had been noted from the Eastern area, this organism was added to the vaccine for the Mediterranean and Middle East, the new vaccine being named T.A.B.C. vaccine.

An account of an outbreak of typhoid fever in January, 1919, in three German towns in British occupation in which compulsory inoculation of all persons from the age of 6 to 55 was ordered by the British authorities is given by Basten[23] and independently by Romanes and Johnstone[24]; 14,343 persons were inoculated twice with T.A.B. vaccine with an interval of ten days between each injection, as in the case of the civilian population in Flanders during the war (*see* MEDICAL ANNUAL, 1920, p. 366). Persons suffering from fevers or serious lung diseases, and women in the last three months of pregnancy and two months after childbirth, were exempted. The incidence of typhoid fever among 14,343 inoculated and 6905 uninoculated inhabitants was about the same, 17 cases occurring among the former and 7 among the latter. Baster attributes this high incidence among the inoculated to there being only two inoculations instead of three as practised in the German army, and to the non-inoculation of one-third of the inhabitants increasing the likelihood of infection for the inoculated. On the other hand, the inoculations appeared to have a favourable effect on the severity of the disease, the mortality among the inoculated being 13 per cent as compared with 19 per cent among the non-inoculated. Both the British and German writers point out another advantage of inoculation, which was that it caused many cases in the incubation stage to develop at once, and so enabled infected cases to be separated from the rest of the population. Lastly, Romanes and Johnstone remark that much good was done by the order that exemption could only be allowed by medical certificate. This, accompanied by an energetic house-to-house inquiry, brought several cases to light which otherwise would have lingered on in their homes.

Guérin-Valmale and Vayssière[25] carried out vaccination of women in a maternity clinic during the last six weeks of pregnancy. About four injections were given of a monovalent vaccine containing 500 million bacilli per c.c., the dosage being ½, 1½, and 2 c.c. injected at intervals of one week into the extensor surface of the arm. The injections did not appear to have any harmful effects on the fœtus in utero. Pregnant women reacted to the vaccine in the same way as non-pregnant women, and the normal blood changes of pregnancy were not altered by the vaccine.

J. S. Bury[26] alludes to the various complications recorded after antityphoid inoculation, such as corneal herpes, albuminuric retinitis, œdema of the glottis, Landry's paralysis, psychical disturbance, and epileptic attacks. He reports the case of a man of 36 in whom symptoms resembling tabes developed after inoculation, although the blood and cerebrospinal fluid gave a negative Wassermann reaction.

TREATMENT.—G. Etienne[27] confirms the value of **Rodet's Serum** (*see* MEDICAL ANNUAL, 1920, p. 367; 1921, p. 485), and holds that when it is used between the eighth and tenth day without any other treatment except cardiac tonics, the course of the disease is almost invariably curtailed, whatever the initial gravity of the case. When the serum is employed late it may also have an abortive effect, but this is not the rule. If given before the eighth day the results are unfavourable, or at least much less definite.

Sir William Leishman[3] states that **Vaccine Treatment** was practically abandoned in France during the later years of the war. He was of opinion, however, that the general condition of the patients seemed to be greatly improved by this treatment, although the pyrexia was not curtailed. The incidence of severe complications was also less in those that had been treated with vaccine.

R. Kharina-Marinucci[28] and F. Luna[29] each report favourably on the therapeutic use of vaccines in typhoid fever in children. The vaccine was given subcutaneously, intramuscularly, or intravenously in different cases.

E. Henes jnr.[30] records seven cases showing the efficacy of the **Surgical Treatment of Carriers,** and confirms the observations of Nichols, Simmons, and Stimmel (*see* Medical Annual, 1921, p. 486). He maintains that an operation is not required until six months after the onset of the disease. He considers that persistent infectiousness following typhoid fever is usually the result of cholecystitis, and that a gall-bladder may continue to be infectious without the usual manifestations of a cholecystitis. The majority of persistent typhoid carriers in his opinion can be cured by removal of the gall-bladder.

References.—[1]*Jour. Amer. Med. Assoc.* 1921, i, 514; [2]*Lancet,* 1921, i, 687; [3]*Glasgow Med. Jour.* 1921, i, 81; [4]*Lancet,* 1920, ii, 1190; [5]*Jour. Amer. Med. Assoc.* 1921, i, 860; [6]*Lancet,* 1920, ii, 886; [7]*Monats. f. Kinderh.* 1921, 373; [8]*Jour. Amer. Med. Assoc.* 1920, i, 297; [9]*Med. Science,* 1920, iii, 202; [10]*Surg. Gynecol. and Obst.* 1921, i, 272; [11]*Med. Science,* 1920, iii, 204; [12]*Ibid.*; [13]*Ibid.*; [14]*Presse méd.* 1921, 375; [15]*Med. Science,* 1920, iii, 206; [16]*Ibid.*; [17]*Ibid.*; [18]*Ibid.* 207; [19]*Ibid.*; [20]*Lancet,* 1921, i, 16; [21]*Ibid.* 218; [22]*Jour. R.N. Med. Service.* 1921, 169; [23]*Deut. med. Woch.* 1920, 316; [24]*Brit. Med. Jour.* 1920, ii, 932; [25]*Surg. Gynecol. and Obst.* 1920, ii, 402; [26]*Lancet,* 1920, ii, 814; [27]*Paris méd.* 1921, i, 225; [28]*Pediatria,* 1920, 689; [29]*Ibid.* 707; [20]*Jour. Amer. Med. Assoc.* 1920, ii, 1771.

TYPHUS FEVER.

J. D. Rolleston, M.D.

Etiology.—E. W. Schultz[1] is of opinion that there is no conclusive evidence that the organism described by Plotz (*see* Medical Annual, 1915, p. 652) is the cause of typhus fever. While *Proteus* X19 has more in its favour as a cause of typhus than the Plotz bacillus, both on immunological and other grounds, it is probable that both these bacteria are merely secondary invaders. Schultz thinks it more probable that the intracellular bodies found exclusively in typhus-infected lice, and known as *Rickettsia Prowazeki* in honour of the scientists who lost their lives in the study of the etiology of typhus, are the real cause of the disease.

Epidemiology.—E. W. Goodall[2] states that from January 1, 1916, to December 31, 1919, there were at least 431,200 cases of typhus in Congress Poland and Galicia combined. During January and February 12,098 cases were notified in Congress Poland and 34,476 in Galicia. The epidemic was widely spread throughout Poland, with a varying attack-rate. The whole country was more or less invaded early in 1919, but the districts which suffered most were those in the East and South West. Galicia and Wolhynia were also severely affected.

According to F. G. Clemow[3], typhus was rare in Turkey before the war, and in Constantinople it was scarcely known as an indigenous disorder. Since the outbreak of the war, however, it has become widely epidemic throughout the greater part of the country. As regards its recent prevalence, the disease became epidemic in February, March, and April in Constantinople, mainly as the result of the influx of Russian refugees after the defeat of Denikin's army. In the summer the epidemic greatly declined, but the disease never wholly disappeared, and in the winter it became active again with the arrival of a still larger crowd of refugees from the Crimea, after the collapse of Wrangel's army. The total number of known cases of typhus during 1920 in Turkey was between 600 and 700.

Morbid Anatomy.—Bompiani,[4] during an epidemic at Rome in 1918, made a histological study of the typhus eruption. Rose spots removed on the eighth, tenth, and fifteenth days of disease showed the characteristic changes described by Fraenkel, which consisted of an accumulation of cells of various dimensions and of a round or irregularly polygonal form, surrounding a vessel. These lesions were most frequent in the reticular layers of the dermis or at the junction of the dermis with the subcutaneous tissue. In addition to the typical nodules described by Fraenkel, large areas of diffuse infiltration (usually connected with a vessel) were found during the eruption period. At an advanced stage of the disease (22nd–27th day) lymphoid nodules and fibroid nodules were found.

Symptoms.—Dumitresco-Mante[5] describes the following three forms of *pulmonary congestion* in typhus: (1) Simple congestion; (2) Congestion round a tuberculous focus; (3) Pseudo-tuberculous congestion. In the last form the congestion is localized at the apex, and presents the clinical and radiological appearances of pulmonary tuberculosis, but repeated examination of the sputum shows an absence of tubercle bacilli. The general condition is usually good, and complete recovery takes place in a few days or weeks. A similar phenomenon has been described in influenza and malaria, but never before in typhus. One of the factors of this congestion is the intense vasodilation characteristic of typhus. The localization at the apex may possibly be due to a latent tuberculous focus.

A. Costiniu[6] discusses the *aural and laryngeal complications* of typhus. Aural complications occurred in nearly 70 per cent of the cases during the Roumanian epidemic of 1918–19. In the early stage of the disease the middle ear only was affected, but in 10 per cent the internal ear was also involved later. Recovery from otitis media was the rule, but recurrences were not infrequent. In otitis interna the results were less favourable. Laryngeal complications, which were observed in about 15 per cent of the cases, usually developed in convalescence. Diphtheria without concomitant faucial lesions was frequent.

Prophylaxis.—J. M. Mitchell and G. P. N. Richards[7] describe the prophylactic measures employed in the British Military Mission to Denikin's Army during the epidemics of 1918–19 and 1919–20. In addition to general measures, such as closely cropping the hair of all patients on admission to hospital, bathing and sponging them with methylated spirit, and putting them into entirely fresh clothing before taking them to the ward, specific prophylaxis was attempted by means of a **Vaccine** which consisted of sterile blood free from fibrin taken from a typhus patient free from other diseases on the first to third day of the rash. Three doses of the vaccine were given in the arm subcutaneously or intramuscularly at intervals of five to seven days, the amounts being 1 c.c., 2 c.c., and 2 c.c. on each occasion. No general reaction was observed. Of 195 of the Mission staff fully inoculated in this way, only 1, or 0·5 per cent, subsequently developed typhus. The number of the staff not inoculated or not fully inoculated was about 800, among whom typhus subsequently occurred in 89, or 11 per cent. The writers conclude that though these results are suggestive, the prophylaxis of typhus by inoculation has not yet been placed on a firm basis.

From a study of typhus fever during the last two years, during which he employed over 200 Japanese monkeys, Kusama[8] came to the following conclusions: (1) The incubation period varies according to the site of inoculation of the virus, the degree of virulence, and the quantity of the virus. The incubation period is shortest when the virus is inoculated intravenously, is highly virulent, or given in a large dose; and is prolonged by hypodermic injection, the use of a weak virus, or a small dose. (2) The severity of the disease varies inversely as the length of the incubation period, so that a small enough dose will prolong the incubation period, cause little or no symptoms, and confer a certain degree of active immunity. By using small doses of a virus (diluted blood of a typhus patient) which had not been rendered less active by animal passage, Kusama produced in monkeys active immunity without any previous febrile reaction; one hundred thousandth part of the smallest dose that caused symptoms was thus capable of protecting against five times the minimum morbid dose. Kusama points out that, before similar prophylactic measures can be applied to man, more information must be obtained as to the virulence of the infecting agent in prevailing typhus, and about man's susceptibility, which is doubtless much higher than that of the monkey to the virus.

Treatment.—Glatard[9] has treated 114 cases of typhus by intravenous injections of **Urotropine**. The doses given at first were 1·50 grm. for adults and 0·75 grm. for children, but were afterwards raised to 3 grm. daily. The number of injections given varied from one to eight, the average being three. The results were as follows: (1) In the great majority of cases urotropine given intravenously favours defervescence, which occurs as a rule after the second injection; (2) It causes abundant diuresis and therefore facilitates elimination of toxins; (3) It lowers the mortality, which was 14 per cent among cases treated by urotropine as compared with 29 per cent among cases not so treated; (4) It should not be used after the temperature has fallen, when the cardiac weakness is better treated by camphor oil, strychnine, and nucleinate of soda injections.

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ULCER OF LEG. (*See also* Skin Diseases, General Therapeutics.)

E. Graham Little, M.D., F.R.C.P.

Kraus[1] recommends dressings soaked in 10 per cent **Common Salt**, applied to the ulcer after cleaning off all the discharge with the same solution. Granulations grow quickly on the surface, and are toned down every two or three days with lunar caustic. Quite large ulcers healed within ten days under this treatment. The healed surface may be covered with 4 per cent boric ointment for ten days or so after healing, as a protective.

Reference.—[1]*Münch. med. Woch.* 1921, Dec. 10, 1439.

ULCER, TROPICAL. (*See* Tropical Ulcer.)

URETER, SURGERY OF. (*See also* Kidney.)

Sir John Thomson Walker, F.R.C.S.

Baker[1] presents an analytical study of 50 cases of *ureteral stricture and pyelitis*. Of these, 39 (78 per cent) were unilateral, 26 on the right and 13 on the left side. In this series 7 (14 per cent) had undergone an unnecessary operation for acute appendicitis. The points of importance in differentiating between the two lesions are: (1) Microscopical examination of the catheter urine; (2) Absence of marked right-sided abdominal rigidity in pyelitis; (3) Hyperpyrexia points to pyelitis; (4) Sequence of symptoms in appendicitis—viz., pain, nausea, vomiting, fever. In *chronic pyelitis* the mistaken operations were divided between the appendix and the female reproductive organs. In this series 11 (22 per cent) had undergone operation for chronic appendicitis, and 6 had been diagnosed as chronic appendicitis and operation recommended. Altogether 27 (54 per cent) had either been operated upon or had had operation recommended.

The second point noted was the consistent occurrence of one or more foci of infection somewhere within the body. The difficulty in most of the experimental work has been to harmonize the constant presence of the colon bacillus in the urine with the types of organisms controlling the field in the organ or organs suspected of being the originators of the mischief. In this series the tonsils were diseased in 21, or 42 per cent, and the teeth were very frequently affected (11, or 22 per cent). In 7, or 14 per cent, both tonsils and teeth presented definite disease. In 2 (4 per cent) there was serious infection of the nasal sinuses, one frontal and one anterior ethmoidal. In only 9 (18 per cent) was evidence lacking of a definite focus which might act as the cause.

Ureteric Calculus.—Crowell and Thompson[2] suggest the following technique for dislodging recently impacted stones in the ureter. A bismuth catheter is passed up to the obstruction in the ureter, and an *x*-ray picture taken to determine whether the obstruction is due to stone, ureteritis, stricture, ureteral kink, or pressure on the ureter. Two c.c. of a 2 per cent solution of cocaine or procaine are slowly injected into the ureter to relax ureteral spasm, and as a rule the catheter can be passed beyond the stone in a few minutes. Another 2 c.c. of the pelvis is then distended with salt solution, and sterile olive oil is injected as the catheter is removed. By this means the muscular spasm of the ureter is relaxed, while the pressure above the stone is increased. If the eye of the catheter cannot be passed beyond the stone, sterile olive oil is injected against it " with considerable force " to dislodge it, to lubricate the parts, and to dilate the ureter below the obstruction. The patient is given morphia, and instructed to drink water freely. The procedure is repeated every second or third day, the size of the ureteral catheter being increased at every treatment. The average number of treatments necessary to remove the calculus was 7, the minimum number was 3, and the maximum 11.

André[3] gives the history of 8 cases to show that repeated catheterization or a permanent catheter is a very efficacious method of removing ureteral calculi if small and situated low down. Ordinary sounds give as good results as sounds of special design. In cases of calculus without urgent complications, treatment may be limited to repeated catheterization ; but if the sound can clear the obstacle, it is better to allow it to remain in place for a day or two to dilate the ureter. If the obstacle cannot be passed, the attempts at catheterization will often move the stone slightly and place it in a position more favourable for expulsion.

In calculous anuria ureteral catheterization should be begun as soon as possible and should be bilateral. If the obstacle can be cleared, a permanent catheter will safeguard the kidney. In such cases the relief of the anuria makes a surgical operation possible if the calculus is not expelled spontaneously. Glycosuria or prostatic hypertrophy may contra-indicate or temporarily postpone operation. In 79 cases of renal lithiasis, operation was considered inadvisable on account of co-existing diseases.

About 50 per cent of stones in the lower ureter which do not pass spontaneously may be removed by ureteral catheters, dilators, etc.

Braasch[4] draws attention to the conditions contra-indicating operation for stone in the kidney and ureter. Within three or four months after the first onset of symptoms 75 per cent of stones pass. Operation should be delayed for at least this time, and perhaps for six months. An exception may be made in cases of excessive pain, evidence of acute cortical or perinephritic infection, urinary retention, or stones too large to pass. When the *x* rays show the stone shadow less than 2 cm. in diameter, operation should be delayed in the hope that the calculus will pass spontaneously. The urgency of operation may not be so great when the stone is situated in a calix or in the cortex.

Multiple stones usually indicate the necessity for operation. If one stone is situated in the kidney pelvis and one in the ureter, the former should be removed first, and time given for the latter to pass if it is less than 2 cm. in diameter.

Lowsley[5] describes a case in which he removed a stone from the ureter by the perineal route. This route was used originally by Fenwick (1898). Lowsley states that this route should not be attempted if the stone is more than 4 cm. from the bladder, or when it is not fixed. It is also inaccessible if the patient is obese. The advantages claimed from the operation are accessibility, efficient drainage, and early getting out of bed after the operation.

REFERENCES.—[1]*Ann. of Surg.* 1921, March, 348 : [2]*Surg. Gynecol. and Obst.* 1920, Oct., 325 (abstr.) ; [3]*Ibid.* 1921, March, 238 (abstr.) ; [4]*Ibid.* 1920, Dec., 483 (abstr.) ; [5]*Ibid.* 1921, April, 300.

URETHRA, DISEASES OF.

Sir John Thomson Walker, F.R.C.S.

Hypospadias.—Niedermayer[1] describes an operation for penile hypospadias performed by Gersuny. The bladder is drained through a perineal incision. The band on the under surface of the penis which causes downward curvation is excised, and the wound closed longitudinally. On each side of this, parallel to it, an incision is made, and the skin turned over so as to form a canal. A transverse incision is made through the skin of the pubes and another about two inches above this, and the penis is passed through under this bridge of skin. The perineal tube is removed fourteen days after the operation, and about a week after that the urine is passed through the new urethra. The penis is now detached from the abdominal wall with the covering skin, and the denuded area covered from the sides of the wound.

Congenital Valves of the Posterior Urethra.—Randall[2] records 2 cases of this condition in patients five and sixteen years old. Young, Fronz, and Baldwin had collected 24 cases and recorded 12 others, and only 3 of these had been diagnosed previous to operation. Barny believed these valves were due to persistence of the urogenital membrane ; Lowsley regarded them as due to an anomaly of the Wolffian and Müllerian ducts ; Watson found congenital bands stretching from the verumontanum to the roof of the urethra in a 14-weeks fœtus.

Urethritis.—Verdie[3] found that 30 per cent of the military cases under his care showed absence of the gonococcus and presence of the colon bacillus. Almost all the cases of infection with colon bacillus had recurrent attacks which had been diagnosed as gonorrhœal ; very few had pain or discomfort ; a small number had diminished force of the stream. The prostate and vesicles might be normal to the finger ; in a few the prostate was enlarged and soft. The vesicles and epididymes were very rarely affected. Various forms of stricture, usually limited to the anterior urethra, were found. The verumontanum was usually the seat of cicatricial contraction. There was slight anterior urethritis. The treatment consisted in **Prostatic Massage** followed by **Irrigation with Hot Permanganate** and then by an **Instillation of Argyrol** or of 10 per cent **Nucleinate of Silver.** In severe cases the urethra was **Dilated** once a week with Kollman's dilators.

Stricture.—Foster[4] advocates **Rapid Dilatation** in narrow strictures of the urethra. Should he fail to get a bougie through the stricture, he opens the bladder and passes a metal instrument along the urethra from the internal meatus and another from the external meatus. By manipulation, these metal instruments can be made to touch, and the anterior instrument is pushed onwards as the posterior one retires. Large instruments are now passed along the urethra, and the stricture is rapidly dilated.

Taddei[5] considers internal urethrotomy may give good results in septic and toxic cases of urethral stricture, but it is associated with a very high mortality. All types of obstruction, he holds, can be treated by **Progressive Dilatation.** When, owing to local or general conditions, slow dilatation is not feasible, urethrotomy may be avoided by resorting either to catheterization through a conductor or to circular **Electrical Dilatation.** Circular electrolysis may be applied either through a conductor or with a Béniqué sound. The negative electrode of a continuous current is applied to the extremity of the catheter, the posterior electrode being applied over the back or abdomen. The author admits that external urethrotomy, urethrectomy, urethrorrhaphy, perineal urethrostomy, and suprapubic cystostomy are indicated in special cases.

Stutzin[6] discusses the treatment of the most severe type of stricture and fistula of the male urethra. He recommends internal or external **Urethrotomy,** or **Excision** of the stricture with all scar tissue. Excision is only possible where the stricture is not more than 3 cm. in extent. If the defect is more than 3 cm. after excision of the scar, and union can only be effected with tension, a true urethrostomy uniting both ends of the cut urethra with the skin should be done. The fistula is closed at a later date. The same procedure is followed if the removal of all scar tissue is impossible. As an alternative the defect may be closed by plastic methods by which a flap is transplanted, or a vein or the appendix used to repair the defect. The latter method often fails.

Urethrorectal Fistula.—Davis[7] draws attention to the value of the **Young-Stone Operation** for this condition, and records 3 cases. Young and Stone recorded 11 successful cases, altogether 13 successful cases out of 14. Of these, 2 resulted from perineal lithotomy, 5 from drainage of prostatic abscess, and 7 from perineal prostatectomy. Suprapubic cystotomy is first performed, and a Davis vacuum drainage apparatus used to keep the bladder dry. With the patient in the exaggerated lithotomy position, a racquet-shaped incision is made in the mid-line of the perineum and surrounding the anus. The rectal mucosa is dissected and the anal sphincter pushed back. The rectum is carefully separated from the urethra, and the dissection continued as far back as the base of the prostate. This is facilitated by division of the sphincter ani anteriorly. The urethral fistula is fully exposed and sutured, and the fascia and levator ani fibres are brought together over it. When the sphincter ani has been previously divided, scar tissue may cause difficulty in the isolation and repair of the muscle. The rectal cuff is pulled down and amputated, and the rectal stump is sutured to the circular skin edge.

REFERENCES.—[1]*Münch. med. Woch.* 1921, June 24, 773; [2]*Ann. of Surg.* 1921, April, 477; [3]*Arch. méd. Belges*, 1920, Aug., 656; [4]*Brit. Med. Jour.* 1921, i. 931; [5]*Surg. Gynecol. and Obst.* 1921, March, 242; [6]*Ibid.* 1920, Dec., 485; [7]*Ibid.* 1921, March, 225.

URINE ANALYSIS.

O. C. Gruner, M.D.

Chlorides.—Atkinson[1] has devised a composite reagent for determining the sodium chloride in the urine. It is composed of: silver nitrate, 6·67 grm.; iron ammonia alum, 75 grm.; concentrated nitric acid, 150 c.c.; and water to a litre. Ninety c.c. of this reagent are placed in a glass-stoppered 100-c.c. cylinder, and 10 c.c. of urine are added from a pipette. After shaking and allowing to stand, 50 c.c. are pipetted off. The excess of silver nitrate is titrated with standard thiocyanate solution (14 grm. ammonium thiocyanate in a litre of water, checked against the reagent until 4·5 c.c. of the latter equal 1 c.c. of thiocyanate).

Acetone.—Pittarelli[2] uses a carbilamine test. One hundred c.c. urine are distilled after being acidified with phosphoric acid. Five or six drops of Bouchardat's reagent, and a like amount of 20 per cent KOH are added to the distillate. If there is no odour of iodoform, a drop of aniline is added and the tube immersed in boiling water. A penetrating odour of carbilamine will be noticeable if acetone be present.

Goeckel[3] uses the nitroprusside test as follows: About 5 c.c. of each of the samples of urine to be tested are placed in the appropriate tube in a row. Ten drops of fresh saturated aqueous nitroprusside solution are added to each tube. A few drops of soda (NaOH) are added to each tube to produce the maximum red colour. Where the red colour is high, there is a high creatinine content; pale shades indicate a low amount. Glacial acetic acid is now added to each. If there is no acetone, the colour returns to normal. If the creatinine is high, green appears; if very high, a blue precipitate forms. If acetone is present, various shades of red appear. By this one test both substances can be detected, roughly qualitatively. Low creatinine should contra-indicate operation unless other factors are favourable to it.

Uric Acid.—The work of Thannhauser and Czoniezer[4] on the form in which uric acid circulates has a bearing on the interpretation of urinalyses of this substance. Purin complexes of uric acid have now been demonstrated in the blood which go to show that the break-down of nucleic acid is not by way of aminopurins, etc., but by way of nucleosids (purin-sugar compounds) and nucleotids (purin-carbohydrate-phosphoric-acid complexes). Should the uric-acid-sugar complex not break up, the urine will contain less uric acid. In gout, where the seat of lesion—in reference to uric acid metabolism—appeared to be in the kidney cells, there is also a failure or abnormality in the form of union in the complex in the blood itself besides the renal inadequacy.

REFERENCES.—[1]*Jour. of Labor. and Clin. Med.* 1920, Dec. 160; [2]*Policlinico (sez. prat.)*, 1920, Sept., 1047, and 1921, May, 621; [3]*Jour. of Labor. and Clin. Med.* 1921, March, 338; [4]*Zeits. f. physiol. Chem.* 1920, Sept., 307, and *Jour. Amer. Med. Assoc.* 1921, March 5, 657.

URINE, INCONTINENCE OF, IN CHILDREN.

Frederick Langmead, M.D., F.R.C.P.

C. E. Sundell[1] points out that the first point to determine in cases of enuresis is whether the micturition is unconscious, or merely urgent and precipitate. Unconscious micturition during waking hours is met with chiefly in cases of grave mental defect, petit mal, or physical abnormality of the bladder or urethra; with these exceptions, clothes-wetting is due to urgency of micturition, the foremost cause of which is nervous in origin. The child is in constant dread lest he may be unable to avert a catastrophe; each failure intensifies the doubt and anxiety, with diminution of control. The treatment is mental, while drugs are only suitable in certain cases. The essential point to remember in cases of bed-wetting and clothes-wetting during sleep is that the bladder empties itself without rousing consciousness, and that consciousness is primarily at fault. The bladder may fill too rapidly and contract prematurely in cases of temporary or permanent polyuria; the urine may have irritating qualities, being too concentrated or too acid; the bladder may be unduly sensitive and intolerant of distention, as in cystitis and bacilluria. In all these conditions an examination of the urine will suggest the appropriate remedy in restriction of fluids or their increase, the use of alkalis, antiseptics, or vesical sedatives such as **Belladonna** or **Hyoscyamus.** Sources of irritation, from which the vesical centre may be stimulated unduly, may be found in phimosis, thread-worms, or local irritation of the perineum, and should be dealt with accordingly. Dulling of the cerebral perception is the main cause. It may be developmental and associated with backward mentality—a group of cases in which thyroid administration meets with its greatest successes. Sleep may be too profound from overtiredness or as a phase in convalescence; the posture of the child in bed or the arrangement of the blankets, may induce partial asphyxiation. Adenoids may act similarly. Nocturnal epilepsy may reveal itself by occasional enuresis.

From the foregoing it is clear that every case must be investigated fully, and all the various factors taken into account. The most successful line of treatment is a triple one: (1) To deal with the associated conditions, when they are present; (2) To build up the health of the child, with a special regard to its nervous balance; (3) To form and confirm a habit of recognition of the bladder's desire to empty itself. The treatment under (1) is subsidiary, that under (2) includes attention to nutrition, habits of work, play, and rest, and the general health. **Arsenic** in small doses is the most useful drug, and can be combined with **Strychnine** with profit. Intrathecal injections he regards as unjustifiable. The chief effort must be directed to the brain and consciousness, and most important is the cordial, continuous, and self-sacrificing co-operation of the mother and nurse. Under similar conditions of life and activity, and with similar amounts of food and fluid, it will be found that enuresis occurs at a fairly constant time during the night. To determine this hour the mother must look at the child every half-hour and record the time. A time-table of enuresis for the individual child can be compiled, and this will be found to be constant. Thereafter the child must be waked a quarter of an hour before each bladder-emptying is due. Soon the child wakes spontaneously and can be trained to empty his bladder in a proper manner. By complete supervision during the day, so as to render each day's routine as like as possible to that of its predecessor, and by determining the time of bed-wetting and forestalling it, Sundell states that the enuresis can be cured, and that quickly.

REFERENCE.—[1]*Practitioner*, 1921, April, 293.

UTERUS, DISORDERS OF. (*See also* RADIOTHERAPEUTICS.)

W. E. Fothergill, M.D.

The use of **Radium** in cancer of the cervix, in myoma, and in uterine bleeding, continues to be a subject of great interest, and many reports and expressions of opinion have been published during the last year. But no definite advance has been made upon the position given in the MEDICAL ANNUAL, 1921, pp. 500, 501, 504, 505. Time must be allowed for the development and standardization of technique and for the collection of end-results, before the subject can again be profitably considered from the gynæcologist's point of view.

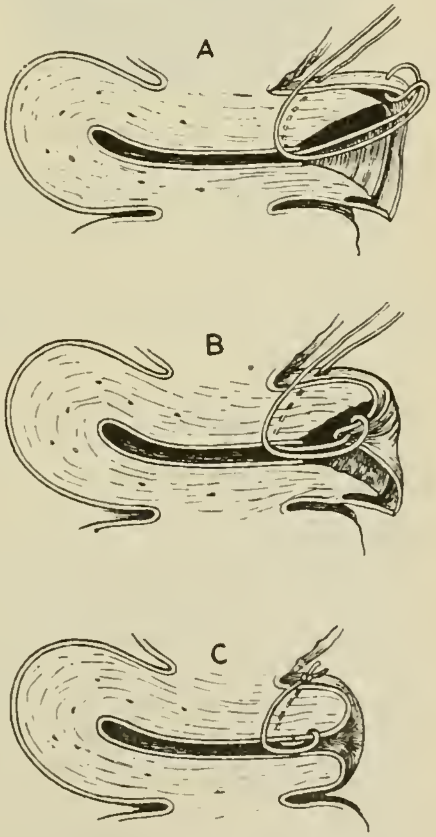


Fig. 85.—Longitudinal section of the cervix and uterus showing the inversion of the cervical reflection of the vaginal mucous membrane. (*a*) Stitch placed; (*b*) Traction on sutures with partial inversion of mucous membrane; (*c*) More traction on sutures with complete inversion of mucous membrane.

Endocervicitis. — Several authors are recommending excision of the cervical endometrium as the most satisfactory treatment for 'cervical leucorrhœa'. Thus H. B. Matthews[1] writes that since 1862, when S. A. Emmett began his observations upon 'cervical erosions', chronic endocervicitis has been the bugbear of gynæcologists, who have failed by all manner of methods to cure the very annoying discharge which issues from the cervix. He describes acute and chronic infections of the cervical glands by organisms such as the gonococcus, staphylococcus, streptococcus, and colon bacillus, and regards the course of the chronic inflammation as slow and insidious, showing little or no tendency to spontaneous cure. Palliative treatment is discarded as inefficient, and curetting is also regarded as useless. The author has been operating by a modified Sturmdorf technique for the last three years, and claims good permanent results. A cone-shaped core is clipped out of the cervix so as to remove all the cervical mucosa without the muscle of the cervix. It is not a high amputation of the cervix, but an excavation of its lining, which is replaced by stitching into the cavity the covering of the portio vaginalis. In 200 cases the author claims 64 per cent of cures, 28 per cent being improved, and 8 per cent not improved.

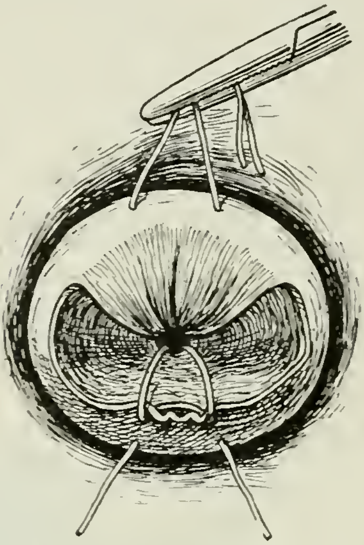


Fig. 86.—Sutures placed. Inversion by traction completed for anterior flap. Note position of suture in posterior flap—not yet drawn up.

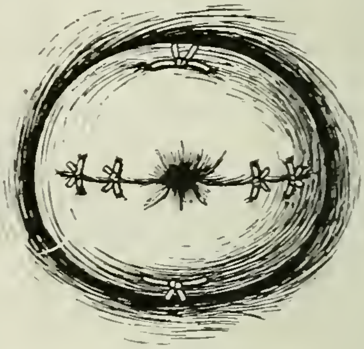


Fig. 87.—Operation completed. Note only six sutures are required.

REFERENCE.—[1]*Surg. Gynecol. and Obst.* 1921, March, 249, from which the illustrations have been drawn.

UTERUS, PROLAPSE OF. (*See* GENITAL PROLAPSE.)

VACCINATION. (*See also* SMALL-POX.) *J. D. Rolleston, M.D.*

I. H. Goldberger[1] during the last seven years, in the course of which he has vaccinated over 500 children, has used the inner and back side of the arm for vaccination, for the following reasons : (1) No visible scar results ; (2) Children are not prevented from having their daily bath while vaccination is going through its various stages ; (3) There is little or no exposure to infection from outside sources of infection ; (4) The sources of trauma are minimized ; (5) No infiltration, extensive induration, sloughing, or extensive scarring results. The method is as follows : After the arm has been cleansed, the forearm is flexed at right angles to the arm, and the vaccine is applied below a line midway between the internal condyle of the humerus and the anterior axillary line. The virus is allowed to dry thoroughly before covering the abrasion with a sterile pad or gauze, which is held in place by strips of adhesive plaster. [The reviewer, who has made trial of Goldberger's method in the vaccination and re-vaccination of a large number of nurses, can fully confirm its superiority to the ordinary methods.—J. D. R.]

F. Kirstein,[2] who has vaccinated 116 newborn children during an epidemic of small-pox, states that though healthy and full-term infants stood the operation as well as older children, vaccination was not well borne by premature infants. He reports a fatal case in an eight-months child who died of the effects of vaccination three and a half weeks after birth. Vaccine pocks developed all over the inoculated arm and gave rise to a deep metastatic abscess behind the right ear. No sepsis or other changes were found in the organs post mortem. Kirstein did not find that the vaccine pocks were slower in maturing or were less well developed in children whose mothers had been vaccinated before delivery, but maintains that the rate of development and size of the pocks were the same as in those whose mothers had not been recently vaccinated.

Langsch[3] records a case of secondary vaccination of the tongue in an infant who had been successfully vaccinated on the arm eleven days previously. The child was restless, refused its food, and was constantly putting its finger into its mouth. Greyish-white patches were seen upon the tongue. There were no other secondary pustules. The lesions on the tongue disappeared in a few days.

Gougerot[4] states that trichophytosis, though very rare, is the commonest complication of vaccination. The lesions, which are usually slow in development, may be single and round, small and oval, circinate, or erythemato-squamous like psoriasis.

G. Pernet[5] reports a case of post-vaccinal psoriasis in a girl, age 16, in whom the eruption appeared two months after primary vaccination while the scabs were still present on the vaccinated area.

A. Sala[6] records two rare complications of vaccination—a streptococcal perinephritic abscess in a woman 33 years old, and a staphylococcal renal abscess in a boy of 15, which developed fourteen days and twenty days respectively after vaccination. Both cases recovered after operation.

References.—[1]*N. Y. Med. Jour.* 1920, ii, 1035; [2]*Deut. med. Woch.* 1921, 328: *Münch. med. Woch.* 1921, 920; [4]*Paris méd.* 1919, ii, 442; [5]*Proc. Roy. Soc. Med.* (*Sect. Derm.*), 1920–1, 12; [6]*Policlinico* (*sez. prat.*), 1921, 151.

VARICELLA. (*See* Chicken-pox.)

VARICOSE VEINS.

Sir W. I. de C. Wheeler, F.R.C.S.I.

Colt[1] deals with the results in 20 cases of Babcock's extraction operation for varicose veins. The method was introduced into this country in 1908 by Sir H. M. W. Gray. A difficulty is sometimes experienced in getting the knob of the instrument to pass a valve in the lower half of the thigh. There is, as a fact, a small tributary in this position, communicating with the deep veins about 4 in. above the patella. The operation (*Figs.* 88, 89) can often be done under a local anaesthetic. The paper is summarized as follows:—

1. Babcock's extraction operation, in cases taken early, results in removing the whole of the internal saphena vein, with up to about 3 in. of each of its tributaries, through two small incisions, in twelve minutes.
2. The extraction operation, combined with local excision of all the tributary junctions of the external and internal saphenous systems, and the extraction or excision of the external saphena vein, should be regarded as the operation of choice in ordinary cases if the symptoms are to be relieved for long periods.
3. No bad results are directly attributable to the extraction part of the combined operation.
4. Further information is required as to the frequency of occurrence of duplication or partial duplication of the internal saphena vein.
5. An investigation by a plethysmographic method of the relationship between symptoms and the carrying capacity and retarding effects of the superficial and deep veins is called for.

Ambulatory Treatment of Varicose Ulcer.—The late Professor Cestan used to say, "The real treatment of chronic varicose ulcer consists in rest and a private income of £400 a year". This was in the happy days before the Crown Prince's "brisk and joyful war"; nowadays a private income of £400 a year, after undergoing the numerous and painful excisions and amputations by doctor and tax-collector, is so reduced that the happy possessor thereof finds it difficult to keep body and soul in stable combination. Dr. Laude,[2] however, in a thesis for the University of Toulouse, has described a method of treatment which is not only successful, but allows the patient to continue

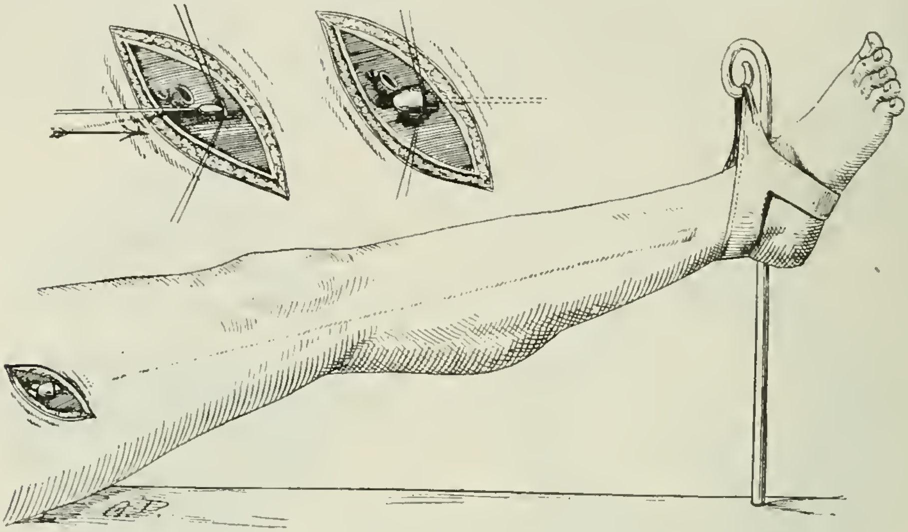


Fig. 88.—Position of leg for Babcock's operation. The internal saphenous vein is exposed near the saphenous opening. The instrument, consisting of a long rigid wire with a 'knob' on each end, is shown passing into the vein from groin to ankle in the small diagrams. (*From Wheeler's Operative Surgery.*)

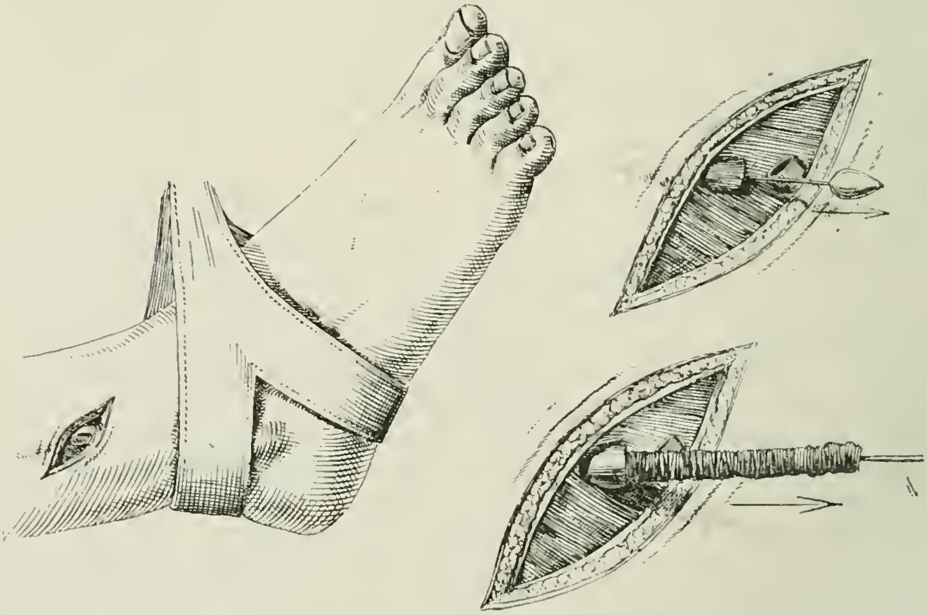


Fig. 89.—The instrument is seen passing through the divided vein above the internal malleolus. Traction on the lower 'knob' in a favourable case succeeds in extracting the entire vein with only small upper and lower incisions. (*From Wheeler's Operative Surgery.*)

his public and private avocations. The peripheric region of the ulceration is first thoroughly cleansed by means of gauze dipped in ether. The surface of the ulceration and neighbouring parts are then thickly covered with the following cream: Biborate of soda 40 grm.; zinc oxide 60 grm.; lime-water 60 grm.; oil of sweet almonds 140 grm.

N.B.—The biborate should be dissolved in the lime-water, the latter being first warmed, and the solution then mixed with the almond oil. The zinc oxide, thoroughly pulverized, is next gradually incorporated with the mixture. The preparation constitutes a homogeneous cream which will last several weeks without becoming rancid.

After application of the cream, the region is covered with two or three compresses of sterilized gauze, and the whole maintained by a 'boot', consisting of two starched bandages, first boiled, and then cooled in a water bath. It is essential that occlusion of the region be perfect, and at the same time that the bandage should not be applied too tightly.

Before applying the bandage it is well to place a little cotton-wool over the tendo Achillis and also the front part of the ankle, in order to avoid compression and nipping of the skin when the patient walks. The dressing takes about twenty hours to dry, and at the end of that period the patient can begin to walk about. The dressing should be renewed as soon as serosity has soaked through; that is, about every five or six days; but in any case it must not be allowed to remain more than ten days, even if no serosity appears externally, in order to avoid maceration of the skin.

It is preferable to apply the dressing the first thing in the morning, when the tissues of the limb are not swollen after the day's fatigue.

Complete cicatrization is obtained, even in cases of very extensive ulceration, in a period of time varying between six weeks and three months.

References.—[1]*Brit. Jour. Surg.* 1921, April, 486: [2]*Med. Press.* 1921, May 11, 377.

VARICOCELE, PELVIC. (*See* Pelvic Varicocele.)

VARIOLA. (*See* Small-pox.)

VASCULAR SURGERY.

Sir W. I. de C. Wheeler, F.R.C.S.I.

Arteriovenous Aneurysm.—Dobrobolskaia[1] draws attention to a sign almost pathognomic of arteriovenous aneurysm, viz., that compression of the artery above the aneurysmal junction produces an immediate general slowing of the pulse-rate. The compression of the corresponding healthy artery in the other limb exercises no influence on the pulse-rate. This sign is absent from simple arterial aneurysms, hence it has a diagnostic value. The sign disappears completely if the aneurysm is removed. It is suggested that the cause of the phenomenon is to be found in certain changes which have taken place in the cardiac muscle, changes which are secondary to the appearance of the aneurysm.

Ligation of the Carotid Artery.—The *Presse médicale*[2] draws attention to the operation of ligature of the carotid artery, of one or both sides, and points out the grave cerebral disadvantages which may follow the operation. In unilateral ligature, the mortality is highest in cases of hæmorrhage (54 per cent). It is a little less after extirpation of tumours in the neck (46 per cent), but considerably lower in carotid aneurysm (13 per cent) and pulsating exophthalmos (7 per cent). The age question is, of course, all-important. In certain cases of hydrocephalus in young children the operation of double ligature has been performed many times, and if a three weeks' interval is left between the operations the danger of any bad effects is negligible. On the other hand, during the war, ligation of the common carotid artery was followed by many of the unpleasant results mentioned in this article. In elderly people with atheroma of the arteries, double ligature is contra-indicated in nearly every case.

References.—[1]*Lyon chir.* 1921, May, 299; [2]*Presse méd.* 1921, June 18, 485.

VON RECKLINGHAUSEN'S DISEASE. *E. Graham Little, M.D., F.R.C.P.*

Weiss[1] notes the rarity of reported cases of this affection in the negro, and records two cases occurring in St. Louis, one in a woman, age 22, and the other in a man, age 46. The first showed the three cardinal symptoms of tumours, pigmentation, and poor mentality. In the second case the number of tumours was extraordinary, but the other two symptoms were less marked.

Reference.—[1]*Arch. of Dermatol. and Syph.* 1921, Feb., 144.

WARTS. *E. Graham Little, M.D., F.R.C.P.*

Kingery[1] has prosecuted further studies in the production of common warts, and demonstrates the possibility of causing their appearance in the second generation, i.e., by the inoculation of a filtrable virus from a wart produced in the first instance by inoculation. The incubation period of this second generation approximated to six months, a much longer time than obtains with other filtrable viruses.

Reference.—[1]*Jour. Amer. Med. Assoc.* 1921, Feb. 12, 440.

WORMS, INTESTINAL. (*See* Ascariasis; Oxyuris.)

WHOOPING-COUGH. *Frederick Langmead, M.D., F.R.C.P.*

J. D. Rolleston[1] reviews some of the more recent observations on whooping-cough. The intramuscular injection of **Ether,** as recommended by Audrain, Weill and Dufourt, Gleyood, and Cheinisse, is considered. The injections are given into the buttock, and the dose is 1 c.c. up to the age of seven or eight months, and in older children 2 c.c. repeated every two days. Weill and Dufourt regard the treatment as superior to any other, and state that it reduces the daily paroxysms, attenuates their violence, and shortens their duration. Gleyood states that the first injections are more effective than those which follow, and sees no contra-indication to the use of ether in doses up to 1 or 2 c.c.; he speaks of it as an energetic cardiac stimulant.

The good effects recorded by Macht as attending the administration of **Benzyl Benzoate,** either alone, or preferably with small doses of **Benzaldehyde,** are corroborated by McMurray, who claims to have obtained immediate improvement from benzyl benzoate in doses of 5 to 30 min. every four hours.

Ochsenius's method of painting the throat with 2 per cent solution of **Silver Nitrate** has been followed by Lederer in 25 cases with good results, ascribed by him to suggestion more than to any bactericidal effect of the drug. He restricts the method to the treatment of older children in whom the attacks have lasted for a considerable time, but without complications, and who evince a neuropathic disposition. Kleinschmidt believes that the duration of the disease may be shortened considerably by **Diathermy.** Freeman, until recently of opinion that **Vaccines** failed to modify the course of the disease, has observed good results from the use of fresh vaccines in cases where vaccines three weeks old were ineffective. The doses were half a billion for the first dose, one billion for the second, and two billions each for the third and fourth. Spolverini reports on the results of the prophylactic use of vaccine in 46 cases and its curative use in 98. His failure with the prophylactic vaccine occurred in only 7 per cent, when it was used before the onset of symptoms. He found vaccine useless if employed 18 to 20 days after the onset when paroxysms were present and the Bordet-Gengou bacillus was no longer recoverable from the sputum. On the other hand, the treatment was successful if adopted within the first days of the disease with the bacillus still present.

J. Phillips[2] reports whooping-cough contracted at birth in two cases.

REFERENCES.—[1]*Med. Science*, 1921, June, 201; [2]*Amer. Jour. Med. Sci.* 1921, Feb., 163.

XANTHOMA, MULTIPLEX.

E. Graham Little, M.D., F.R.C.P.

Burns[1] reports a new case of this rare condition, and was able to confirm the findings of other investigators that the cholesterol content is increased in tissues and blood. The cholesterol blood-content was found to be considerably increased under normal mixed diet, under low fat diet, and under high fat diet. Under high fat diet the increase was excessive. Cholesterol was also found in large quantities in all xanthoma lesions examined. It seems probable that xanthoma multiplex is a dermatosis whose origin lies in the increased amount of cholesterol in the blood, the skin lesions of which are caused by its deposition in this tissue, where it induces a peculiar secondary connective tissue hyperplasia.

REFERENCE.—[1]*Arch. of Dermatol. and Syph.* 1920, Oct., 415.

X-RAY APPARATUS. (*See also* ELECTROTHERAPEUTICS *and* RADIOTHERAPEUTICS.)

C. Thurstan Holland, M.R.C.S.

Plates.—An interesting development in the manufacture of *x*-ray plates is the subject of two papers by Levy and West[1] and Thorne Baker.[2] These papers deal with a method of superimposing upon the ordinary radiographic plate emulsion a film consisting essentially of the fluorescent material—calcium tungstate—used for making intensifying screens. By this method the fluorescing material is brought into optical contact with the sensitive emulsion, and it is claimed that exposure is cut down to one twenty-fifth of the normal amount. In developing the plate, the first process is to dissolve off the intensifying emulsion; following this, development and the after-treatment of the plate proceeds on the usual lines. These papers enter into detail as to the experimental work preceding the successful production of the plate, give full instructions as to treatment and development, and are illustrated with both human radiographs and radiographs of metals.

A Safety Device for Tubes.—Blaine,[3] in view of several instances of death of the patient from contact in using the modern auto-transformer control with modern apparatus and Coolidge tubes, has contrived a safety device to protect against such accidents. He illustrates a cage or cover of insulating material placed over both tube and terminals, and attached to the tube-stand. The high tension wires, etc., are enclosed in insulated tubes. Using this, neither the patient nor the operator can touch the danger points under any of the ordinary working conditions.

REFERENCES.—[1]*Jour. Röntgen. Soc.* 1921, April, 55; [2]*Ibid.* 59; [3]*Jour. Amer. Med. Assoc.* 1920, Dec., 1716.

X-RAY DIAGNOSIS. (*See also* ELECTROTHERAPEUTICS *and* RADIOTHERAPEUTICS.)

C. Thurstan Holland, M.R.C.S.

GASTRO-INTESTINAL TRACT.

Œsophagus.—Skinner[1] reports and illustrates a rare condition of atresia of the œsophagus in an infant four days old. The radiographs show, high up in the thorax, appearances very much like those seen in the case of a pouch. The autopsy showed that the œsophagus ran down to the level of the bifurcation of the trachea and ended in the form of a pouch with a fibrous band attaching it to the trachea. The scanty bibliography is given.

Stomach.—An address by Alvarez,[2] "Peristalsis in Health and Disease", is full of useful observations, and helps materially to explain the passage of food through the alimentary canal. The key to an understanding of the peristalsis is to be found in a study of the smooth muscle in the wall of the bowel. The author discusses fully the theory of rhythmic gradients, and points out its practical value: it is probable that by its means many of the phenomena observed in peristalsis in disease can be explained.

Linitis Plastica.—Le Wald[3] reports upon five cases, and considers that the condition may be due to fibromatosis, syphilis, or diffuse carcinoma. A case of each description is illustrated by radiographs, and these show no specially distinctive features one from another. The author warns the radiologist against making a definite statement as to the cause from the *x*-ray findings alone, although the *x*-ray picture is conclusive as to the typical appearance of leather bottle.

Hour-glass Stomach.—Thurstan Holland[4] has seen 151 cases of this condition. His paper discusses the various forms as shown by radiography, and points out their causes. The fallacies and possible sources of error in *x*-ray diagnosis of simple hour-glass stomach, such as gastroptosis, malignant disease, external pressure upon the stomach, spasm, etc., are referred to and illustrated. The chief point of this paper is a discussion of sex occurrence, and it is suggested that when the condition is found in a female who gives a long history of indigestion it is practically always due to simple ulcer; whereas, although it occurs in this form in males, it is rare; and the hour-glass condition found in a male should always give rise to the suspicion of malignant disease. The conclusions reached are backed up by the results of some 78 cases which were operated upon and the after-histories of which were known.

Ulcer of the Stomach.—MacCarty[5] has made a study of 507 simple chronic ulcers and 895 carcinomatous ulcers, and his paper will be found of use in trying to arrive at a correct *x*-ray diagnosis, as many of the points he makes have a distinct bearing on the *x*-ray appearances. For instance, it is stated as a fact that from the microscopical examination of a large number of specimens it has been found that chronic gastric ulcers larger than 2 cm. in diameter are usually carcinomatous: accepting this, then the radiologist finding an ulcer of this, or larger, size may guess that it is malignant. Unfortunately, the converse of this is not true, as many chronic gastric ulcers under 2 cm. in diameter are also carcinomatous. The essential point for the radiologist underlying this interesting communication appears to be that on the *x*-ray evidence alone an ulcer so diagnosed cannot be reported upon as other than an ulcer, and no differential diagnosis as to its being simple or otherwise should be risked. Carman,[6] in discussing the *x*-ray diagnosis of ulcer of the stomach, considers that often the diagnosis must be made on indirect signs only, and especially in that type of ulcer which he describes as "small mucous erosions and minute, slit-like ulcers", neither of which is capable of holding sufficient barium to make a visible projection. The indirect signs he considers diagnostic are: (1) Organic hour-glass stomach; (2) Spastic manifestations, (*a*) hour-glass stomach, and (*b*) gastrospasm; and the corroboration signs (not diagnostic): (1) Retention of the 6-hour meal; (2) Gastric hypotonus; (3) Alterations in peristalsis. All these he discusses in detail, and he also deals with duodenal ulcer on the same lines. Those interested in statistics will find much information in a paper by Lafferty,[7] in which he contrasts symptoms, and *x*-ray and operative findings, in a series of 1100 examinations of the gastro-intestinal tract.

Duodenum.—Grégoire[8] pictures and relates a case of *megaduodenum* in which symptoms of abdominal trouble had been present for twenty years. The second and third parts of the duodenum were enormously dilated. It is of interest to know that whilst the diagnosis was confirmed by operation, nothing was found which would account for the dilatation.

In 1000 consecutive examinations of the alimentary tract, Spriggs[9] found *duodenal diverticula* ten times. These cases are described, and radiographs show diverticula of various parts of the duodenum: four cases were in the second, and five in the third part. In one case the diverticulum was seen at operation; in two others operations had been performed previously to the *x*-ray examination, but the condition had not been recognized. In only one of the cases could the symptoms be connected with the presence of the diverticulum. The author points out that the *x*-ray appearances are likely to be puzzling unless the radiologist has knowledge of this condition.

Colon.—George and Leonard's[10] article on *diverticulitis of the colon* is very complete, and an extensive bibliography is added. This paper may be looked upon as the summing up of all that is known as to this condition up to the present time; the illustrative radiographs are fine and conclusive. The technique of the authors is described, and whilst using both the meal and the enema, it is considered that the latter is not so satisfactory as the meal for visualizing the diverticula. Three classes of cases are recognized: (1) Those showing simple diverticula scattered along the colon—the patient may have no symptoms; (2) Cases showing commencing secondary inflammatory changes—these usually show the diverticula well localized about the descending colon and the sigmoid, and the patients usually present symptoms; (3) Cases showing advanced secondary inflammatory changes such as pericolitis, tumour, obstruction, etc.

Hirschsprung's Disease.[11]—A case with its radiographic findings is described by Ware. The child was 8 years of age, with chronic constipation and an abdominal mass. The meal by the mouth does not appear to have been satisfactory, except as showing the displacement of the stomach, small bowel, and transverse colon, evidently from the pressure of the abdominal tumour; the injection immediately filled up a pouch-like mass, the distended sigmoid and descending colon, and this filled the whole pelvis and the left-hand side of the abdomen. *Plate XLIX* shows the form of this disease known as *megasigmoid* in a boy 9 years of age.

Appendix.—Baetjer and Friedenwald[12] consider that great aid is afforded by *x*-ray examination in the diagnosis of lesions of the right quadrant of the abdomen, especially when the *x*-ray findings are correlated with the clinical and other findings. Dealing largely with the appendix in chronic disease, it is considered that when an appendix remains visible for more than a day or two after the test-meal, it is, in proportion to its poor drainage, dangerous: on the other hand, it should be noted that the appendix may be markedly diseased without this being visible on *x*-ray plates.

Other conditions discussed are the incompetent ileocæcal valve and ileal stasis, dilatation of the cæcum with retention, adhesions and angulation of the bowel, tuberculous and carcinomatous ulcerations, in all of which much valuable information is possible from a carefully conducted *x*-ray examination.

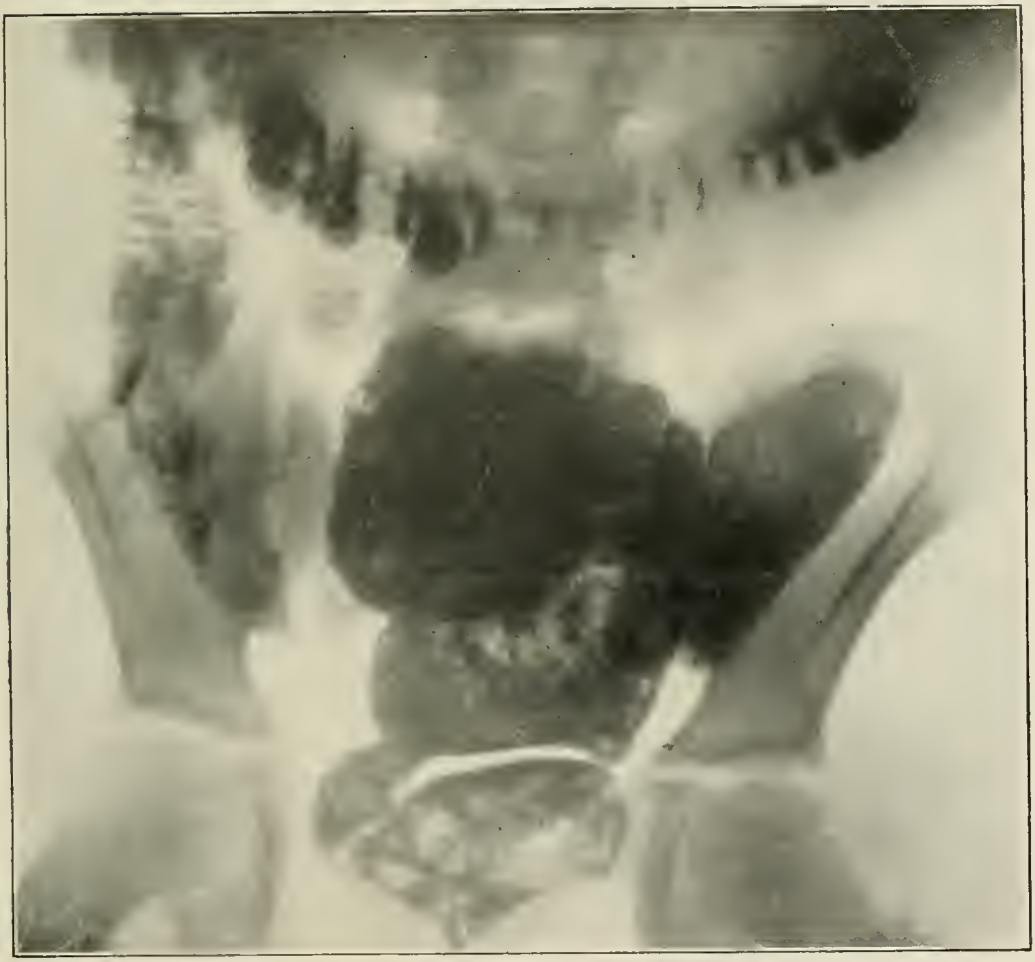
A very complete paper by Ellis[13] on chronic appendicitis from the *x*-ray point of view agrees in the main with the above, but Ellis lays stress upon those cases in which the appendix is not seen; he regards this as highly suggestive of chronic inflammation; he also considers that the presence of a Lane's kink is a confirmatory sign. He suggests also that certain *x*-ray appearances constitute a syndrome, and that these have four cardinal features : (1) Delay in the progress of the opaque meal at the ileocæcal region ; (2) A Lane's kink ; (3) A controlling pathological appendix ; and (4) The kink of the proximal portion of the transverse colon. All these are shown in a number of good illustrations. A third paper on the same subject by Jaisson[14] adds still further to the radiology of this condition. This author contrasts, by means of drawings from radiographs, the findings seen in the healthy appendix and those in chronic appendicitis. *Plate L* shows a large appendix 26 hours after a meal, and in one part shows the barium outlining a concretion found later at operation.

Gall-bladder.—Two papers by MacLeod[15] on the subject of *gall-stones* are worthy of notice. This writer has met with considerable success in the *x*-ray diagnosis of gall-stones, and this notwithstanding that his apparatus was of no great power. His remarks on technique are interesting, and his criticisms of the writings of other workers on this subject are very much to the point. He favours the stereoscopic method of examination without any compression, and suggests the comparison of the movements of shadows which may be present on the plates with the shadow of the right edge of the vertebra opposite such shadows, as a guide to the depth from the plate of the cause of the shadow. Sessa[16] also contributes to this subject, and agrees with Knox as to the value of the lateral position in arriving at a differential diagnosis. An interesting point he makes is that, although using similar apparatus and technique to that used by English and American workers, the Italian radiologists do not find so many gall-stones. He wonders whether it is that either racial differences, or perhaps difference in food, means that in Italy there are either fewer cases of gall-stones or else that the stones produced are more generally transparent to *x* rays. There is a lengthy paper by Roberts[17] in which, in addition to the question of showing stones, the author also discusses the value of radiography in other conditions of the gall-bladder. He describes his technique, and is insistent on the necessity of using only direct rays of a low penetrating power with duplitized films and fast screens. He also advocates the employment of a fine-focus hydrogen tube. His opinion is that the *x*-ray diagnosis of gall-stones and the dilated gall-bladder is possible at the present time, with a small percentage of failures, but only with the expenditure of much time and money, and with very expert reading of the plates or films.

Liver.—A further study of liver atrophy has been made by Strathy.[18] He describes his method of measuring the liver so as to arrive at a conclusion as to the differences in size from the normal which would warrant an opinion from the *x*-ray examination that a liver is atrophic. In cases of atrophy there is a decrease in the vertical or the transverse measurement of the liver shadow, or in both. A decrease of the transverse diameter of the liver is more common than a decrease in depth.

Pneumoperitoneum.—Much literature, chiefly from foreign sources, has appeared on this subject during the year. Roberts,[19] whilst not adding anything important to what was already known, gives a lucid statement as to the methods of examination which he adopted, and he illustrates his paper with radiographs showing his results. Faschinbauer and Eisler[20] lay stress upon the value of the careful preparation of the patient prior to examination. The bowels are kept well evacuated for some days, no food is given on the day of the examination, and immediately before it the bladder is emptied. Their full technique is described. For contrast, the stomach is often distended by an effervescing powder, and the colon by blowing up with air—two proceedings which give a better view of the liver ; and the authors consider that the liver from the diagnostic point of view lends itself to this method of examination.

MEGASIGMOID

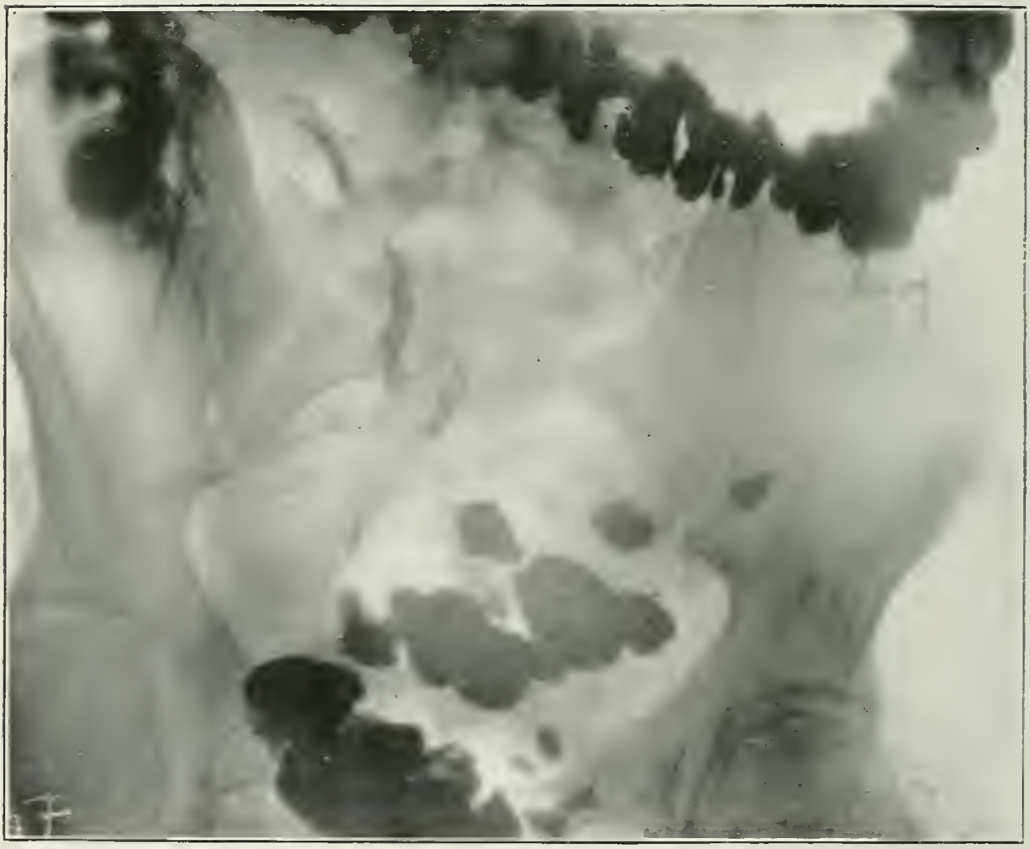


Male, age 9. Twenty-four hours after meal.

C. Thurstan Holland

PLATE L.

APPENDIX



Twenty-four hours after meal. Barium outlining a concretion found afterwards at operation.

C. Thurstan Holland

which is also of use in searching for metastatic growths, but offers no special advantages in the diagnosis of gall-bladder conditions.

Tyler[21] writes on pneumoperitoneum as an aid in the differential diagnosis of diseases of the left half of the abdomen in those obscure cases in which diagnosis by other means and by other methods of *x*-ray examination has failed. He has met with success in such cases as *new growth of the kidney*, different types of *enlarged spleen*, *growths in the left half of the colon*, *cysts of the pancreas*, etc. He publishes typical cases in short detail, and reproduces diagnostic radiographs.

Santé[22] shows that *retroperitoneal masses* can be demonstrated and differentiated by this method. He uses a special position of the patient, who lies face down on a table, but with supports under the pelvis and lower chest to allow the abdomen and its contents to fall well forward. An interesting series of radiographs showing the normal and abnormal illustrates this paper.

Rubin[23] has produced pneumoperitoneum by the injection of oxygen through the uterus and Fallopian tubes, and thus proves the *patency of the Fallopian tubes.* He quotes cases showing the value of this proceeding in cases of sterility, and compares it with the method of injecting an *x*-ray opaque solution as a test of tubal patency. Technique is given, and in 100 cases there has been no untoward sequelæ. The paper is illustrated.

Alvarez[24] strongly advocates the use of CO_2 in preference to oxygen, and enters fully into details of administration. He considers the gas technique very useful in gall-bladder conditions. The chief reasons for using CO_2 are its cheapness and the fact that it causes much less distress to patients than oxygen.

BONES.

Probably one of the most valuable of recent advances in technique has been the perfecting of the *Bucky diaphragm* by Potter, of Chicago ; and the *moving-grid diaphragm* designed by the latter has given us bone radiographs of remarkable perfection. Van Allen[25] and Bowen[26] describe fully the methods of use of this piece of apparatus, its advantages and disadvantages, and the technical details which have to be mastered and overcome before the finest results are obtainable. Potter[27] describes its use in the radiography of the spine, and this paper is illustrated with many beautiful examples of both anteroposterior and lateral views. He recommends the use of double-screened films in preference to plates. One of the greatest advantages is that, with its use, radiographs of large areas of the spine can be produced in which each bone is shown quite as well, if not better, than when concentration is made by means of a small diaphragm compressor on a few vertebræ : this applies equally to the lateral and anteroposterior views. By its means secondary radiations are entirely eliminated, and therefore thick subjects no longer present any difficulties. Potter[28] in another paper illustrates his diaphragm by means of photographs, and explains the principles of its action and the methods of using it.

Tuberculosis in Bones and Joints.—A valuable, comprehensive, and well-illustrated paper by Försell[29] emphasizes the importance of radiology for making the differential diagnosis of tuberculosis affecting the osseous system. He points out that whereas the localization and extent of any bone abnormality caused by disease is accurately displayed by *x* rays, radiography goes further than this, and in doubtful cases can often demonstrate the tuberculous or non-tuberculous nature of the lesions. In this paper the very early *x*-ray signs of a tuberculous affection are discussed and their importance is demonstrated, whilst the danger of placing too much reliance on a negative

x-ray result is emphasized, as it is shown that in certain conditions the early changes of a tuberculous infection may not give rise to any x-ray abnormality.

An interesting communication concludes with a discussion of the x-ray appearances in many bone conditions other than tubercle, in which by means of radiographs a correct diagnosis can be reached—these conditions include such diseases as *Köhler's disease of the scaphoid*, *Legg's disease*, *syphilis*, *malignancy*, and so on.

Legg's Disease.—The importance of the differential diagnosis of this disease from tubercle has hardly yet been realized, but it has become clear that it is of much more common occurrence than has hitherto been recognized, and that its certain diagnosis can only be made by the x ray. Fairbank,[30] under the name of pseudo-coxalgia, briefly describes the symptoms of the disease and the radiological appearances. The characteristic x-ray changes are: (1) A flattening of the epiphysis of the head of the femur, which may also be irregular in outline, or even broken up; (2) The epiphyseal line less distinct than normally; (3) The neck of the bone irregular, fluffy, and much thickened, at any rate in its lower part; it may also show clear, transparent areas; (4) Fluffiness and irregularity of the acetabulum, especially in its upper half. Mouchet and Ill[31] state that the clinical evidence goes for nothing, and that the radiological appearances are everything. This paper is illustrated, and one of the illustrations shows an unusually fine example of the disease in which both sides are affected, which is also unusual. A further paper by Mouchet[32] agrees with the x-ray appearances as stated by Fairbank, points out that two-thirds of the cases are in boys, and that the most frequent age is from 5 to 9 years, unilateral involvement being the rule. Sorrel[33] gives an account of six cases, with good illustrations. He enters into a detailed account of the x-ray appearances, and agrees with other authorities. Buckley[34] publishes a case in a female of 32 years, the radiograph showing a marked disorganization of the head of the femur plus distortion of the neck; it was associated with little or no disability in walking, and equally little limitation in movements of the joint. As in this case there were other bone conditions, such as peculiarity of the terminal phalanges of the fingers and diminished size of the long bones; the suggestion is made that the cause was a general failure to a slight extent of the development of the process of ossification.

Sacralization of the 5th Lumbar Vertebra.—A considerable amount of attention has been paid recently to the condition described under this name. Japiot[35] describes this condition, and recognizes types which he designates. The true condition may be either unilateral, or bilateral and symmetrical. He considers that it is entirely a radiographical diagnosis, and is usually made during such an examination for an obscure pain, simulating sciatica or even kidney pains: it is much more common than is usually known. This paper is illustrated with line drawings of true sacralization, and of conditions of the 5th lumbar vertebra and its transverse processes which may also give rise to similar pains. Clap[36] has met with 111 cases in which there existed, and were shown radiographically, anomalies of the 5th lumbar vertebra. In all the cases the condition was found in making examination for other known, or suspected, conditions; many of the cases were of true sacralization. The paper is illustrated by numerous drawings, etc. Seven cases are reported by Ledoux and Caillods,[37] five others by Noré-Josserand,[38] one by Keating-Hart.[39] All these observers agree that the symptom, if present at all, is an obscure pain, and that the diagnosis is not possible except by radiography. During the past six months I have seen 6 cases, all of which were sent for examination for query kidney or bladder stones, and in which essentially the

PLATE LI.

SACRALIZATION

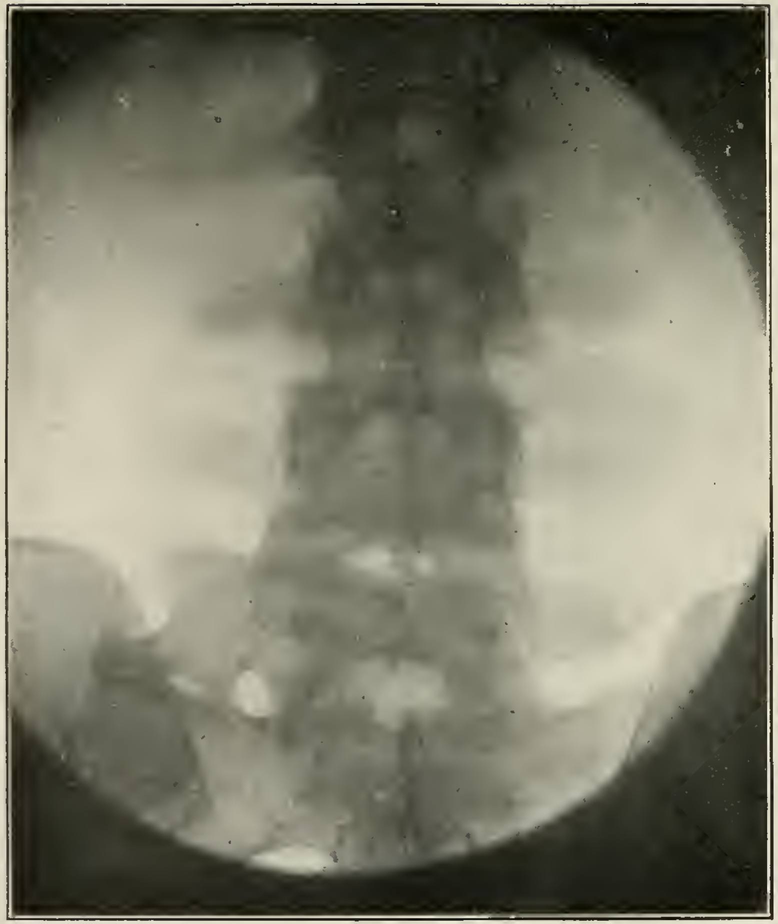


Fig. A.—Left-sided sacralization in a woman, age 30.

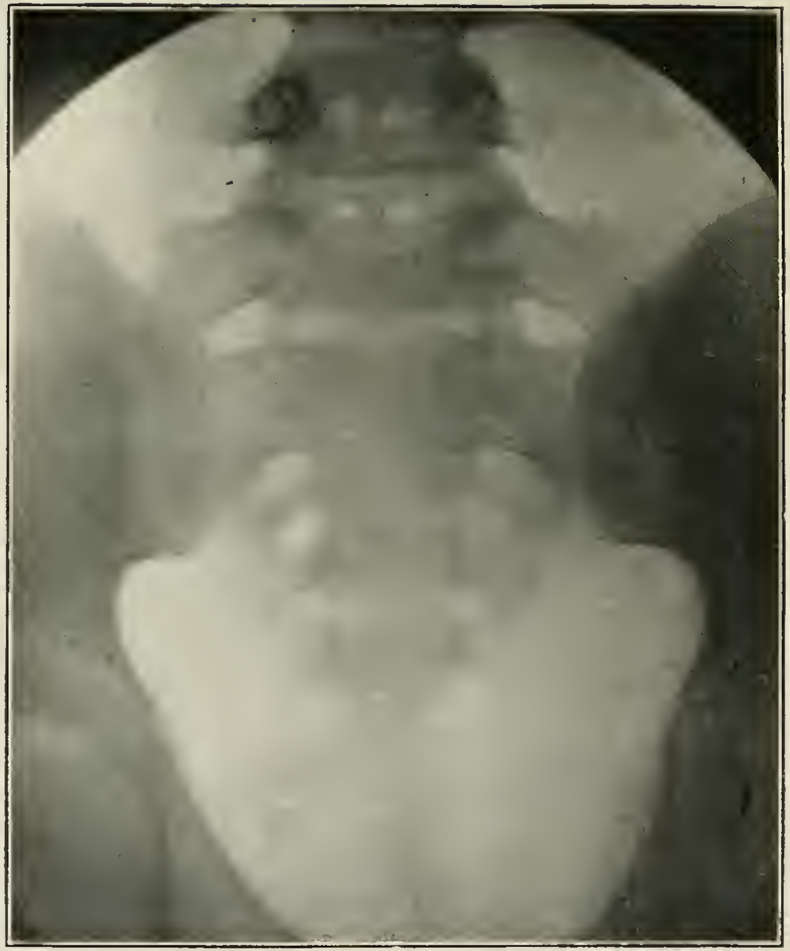


Fig. B.—Bilateral sacralization in a girl, age 10.

C. Thurstan Holland

PLATE LII.

ILLUSTRATING BONE RADIOGRAPHY

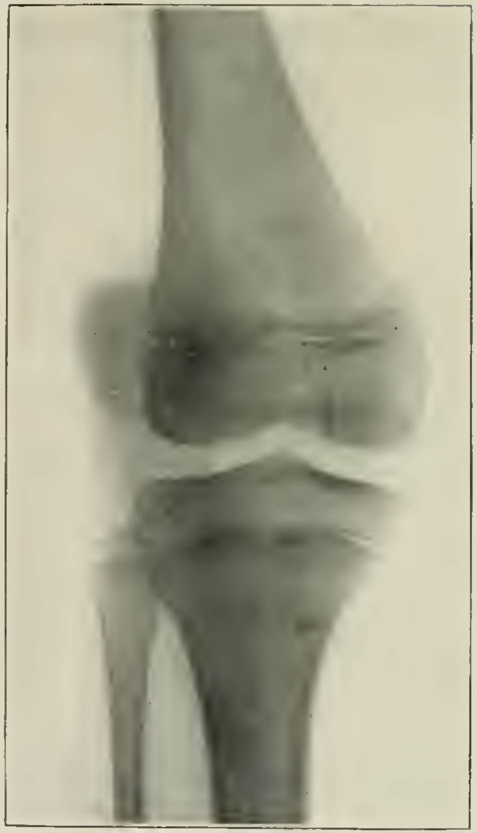


Fig. A.—Congenital slipping patella.

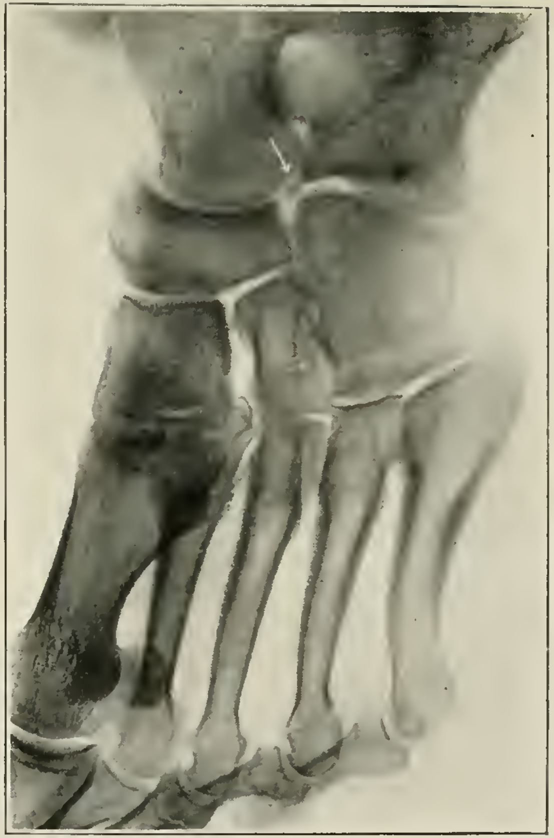


Fig. B.—Showing a supernumerary os calcis (indicated by arrow).

MEDICAL ANNUAL, 1922

C. Thurstan Holland

symptom was an obscure pain ; 5 were females. In 3 the condition was symmetrical, in 3 unilateral. One was in a child of 2¼ years of age. In one of the unilateral cases (*Plate LI A*), a woman, the pain was so severe that on the *x*-ray findings it was decided to operate and the bone was chiselled away. The immediate result, as regards the pain, was satisfactory, and five months later she reported herself as quite cured, having had no pain since the operation. *Plate LI B* shows a bilateral case, a child 10 years of age.

Congenital Dislocation of the Patella.—This affection is referred to in a paper by Muller.[40] It is an uncommon condition, and the displacement, if sideways, is practically always outwards. *Plate LII A* shows the radiographic appearances in the case of a girl 9 years of age, where the condition, owing to the free mobility of the patella, caused considerable discomfort and disability.

Supernumerary Bones of the Foot.—This is the subject of a thesis by Loyer[41] in which eight variations are referred to, four of which have been demonstrated radiographically, and four which are stated never to have been shown. He states that the *supernumerary os calcis*, of which an example has been found in a mummy—a small bone situated in the space between the anterior parts of the os calcis and astragalus, the scaphoid, and the cuboid—has not been seen radiographically. Lupo,[42] however, referring to it as rarely found in an isolated state, shows a radiograph in which it existed as an isolated unit. It is an extremely small bone, and, even when present, would not often be shown radiographically, owing to the overlapping of the bone shadows in this region. I have come across one example—accidentally discovered in the foot of an adult male of 52 years of age (*Plate LII B*). Thurstan Holland[43] publishes a long and profusely illustrated article on the rarer ossifications seen during *x*-ray examinations, which deals chiefly with the accessory bones of the foot, but includes Köhler's disease, and a very rare condition of the patella. The chief portion of this communication is a discussion of the abnormal ossification at the base of the 5th metatarsal bone, called the *bone of Vesalius*. This bone is of great interest in view of injuries to the foot, and varieties occur. Laquerrière[44] adds another case of what is probably the true bone, which has to be distinguished from a simple epiphysis.

Cysts of Bone.—Parola and Celadar[45] discuss the pathology of simple cysts, and enter in detail into the differential radiographic diagnosis from other conditions. The chief points are the regular and smooth cortex, the shape and transparency of the cavity, and the clear margins ; but there are many other minor points which often assist in coming to a correct diagnosis. This paper contains valuable radiological material. Corlette[46] describes a case of *multilocular hydatid bone cyst* in its clinical, radiographic, and post-mortem aspects. The condition is rare in England, but should be remembered, as, in its broad features, according to the author, it has a peculiarly striking resemblance to sarcoma of bone.

Xanthoma.—Merrill[47] has investigated, radiographically, a case of this rare disease ; he discusses the pathology and reproduces radiographs of the hands and feet, in which, underlying the superficial lesions, are shown definite abnormalities of the bones, characterized by destruction, which in some of the smaller bones was of a cystic character. These findings confirm the previous belief that the disease is a systemic condition in which many tissues are involved and in which the bones may share in the process.

Syphilis.—In a paper on syphilis in the *fœtus* and in young infants, Shipley, Pearson, and Weech[48] emphasize the difficulties of diagnosis in the very young child, and suggest that not enough use is made of *x*-ray examination of the bones as an additional means. This paper, which is illustrated, is based upon the *x*-ray examination of 300 fœtuses, a very large proportion of which showed some bone changes ; a full description of these changes will be found in the paper. Bearing upon this subject, Lovett and Wolbach[49] have made a research on certain cases of obscure bone lesions in which there was a doubt, before the operation, as to the diagnosis, *x*-ray and otherwise. Tuberculosis, osteomyelitis, and syphilis are dealt with, and the paper is profusely illustrated with very good radiographs. The chief part is that which contrasts the radiographic appearances with pathological and operative findings, the important lesson being that tuberculosis in bone may simulate any other infective process in the localization and character of the lesions : certain diagnosis, from the *x*-ray appearance alone, is therefore not possible.

MISCELLANEOUS.

Kidneys.—A useful article on technique by Lawrence,[50] illustrated by a series of radiographs outlining the whole of the kidneys, lays stress upon the method in which he applies the cylindrical compressor of his tube-stand. Judging by his results, this technique is worthy of consideration. The paper deals with other points, such as the preparation of the patient, the condition of the tube, etc.

Cameron[51] has made a comparative study of *sodium iodide* as an opaque medium for pyelography. From these experiments it appears to be proved that this salt has many advantages over others. A 13·5 per cent solution is recommended, prepared by dissolving 15 grm. of the salt in a sufficient amount of water to make 100 c.c. This is a neutral solution, mildly saline in taste, non-irritating, and does not form precipitates with blood or urine. Although not the least expensive of pyelographic media, its freedom from producing toxic effects and irritation, and the ease with which it can be prepared, etc., are strongly in its favour.

Lungs.—Lynah and Stewart[52] have injected a bismuth mixture through a bronchoscope into cases of *bronchiectasis* and *lung abscess* for the purpose of diagnosis, and show a number of radiographs which illustrate the appearances after injection. They conclude that there is no danger, and that the proceeding is of the greatest use in mapping out abscess cavities. The *x*-ray examination should be made immediately following the injection of 8 c.c. of bismuth subcarbonate in pure olive oil (1-2) rendered sterile by boiling. It should be injected slowly. Stereoscopic plates are the best. The radiographic findings in simple *syphilis* of the lung and in the double infection of syphilis plus tubercle are discussed and illustrated by Watkins,[53] who since 1916 has made a systematic search for lung syphilis. In 6500 examinations of chests he has either made, or assisted in making, a definite diagnosis of syphilis in 172 patients. Of 948 patients showing the lesions of tuberculosis, 209, or over 22 per cent, had syphilis as well. The radiographs in this paper are very striking. Jarvis[54] has made an *x*-ray study of *dust inhalation* in the granite industry, and his paper, after reviewing the literature of the subject, gives an account of his own researches. He illustrates with typical, and exceedingly fine, radiographs the various changes set up in the lungs ; and in summarizing his results suggests that many *x*-ray diagnoses are being made of tubercle which are in reality pneumoconiosis. He classifies his cases from the *x*-ray appearances into three main divisions—pneumoconiosis, fibroid pneumoconiosis, and tuberculous pneumoconiosis—and each of these into three stages. There is a large amount of valuable information, apart from *x*-ray work, in this paper, and it should be referred to by all interested in the subject. Recognizing that the diagnosis of *intrathoracic neoplasms* is often very difficult, Fishberg[55] advocates the production of an artificial pneumothorax to complete the *x*-ray examination in doubtful cases: he has been able by this means, in cases both with and without fluid, to demonstrate by radiographs growths otherwise not shown, and has thus cleared up the diagnosis. In view of the harmlessness of the procedure, it appears that it should be done in all the doubtful cases. The technique is described and the paper illustrated.

Teeth.—In an article on oral sepsis, Bertram Watson[56] draws attention to the great importance of an *x*-ray examination of the roots of the teeth in cases of chronic disease in which the symptoms suggest that there is some form of septic absorption. He quotes a number of cases of complete cure following the removal of teeth after an *x*-ray examination has revealed the presence of apical abscesses, when the ordinary routine of a dentist's examination has shown nothing and the teeth were reported as being above suspicion. He strongly urges that more use should be made of *x*-ray examinations in this country by dentists, and that a merely external tooth examination is not sufficient to exclude even advanced apical conditions. An analysis of 70 cases is included. Admitting that in many cases removal of infected teeth failed to cure, the probability is pointed out that these failures are due to the fact that extraction has been done too late, remote places have become infected, and the disease continues.

Calcification in Angiomata.—Wakely[57] publishes details of two cases of angiomata of the legs, confirmed by operations, in which many small rounded shadows were shown in the radiographs. After removal, microscopical examination showed these to be due to calcified phleboliths. The condition is a rare one.

Obstetrics.—Recasens[58] publishes some remarkable radiographs showing the possibilities of radiography in obstetrics. A radiograph of a *twin pregnancy* settles the diagnosis, and shows the relationship of the twins to each other and to the maternal pelvis. The usefulness of pre-natal radiographs is shown in such cases as *deformities*, *hydrocephalus*, etc.

Pathology.—A series of fourteen papers entitled "A Concept of *X*-ray Pathology" deserves the careful attention of every radiologist. These are by Pacini.[59] *X*-ray pathology means the study of radiographs interpreted in the light of the pathology responsible for relative changes in radiographic shadows as compared with the normal; it depends on a basis of anatomy, gross histology, physiology, and pathology. The author approaches his subject from this point of view, and discusses radiography as applied to the lungs and pleura, the heart, bones, joints, the head, teeth, fractures, dislocations, the gastro-intestinal tract, and the kidneys; each paper is complete in itself. It is impossible in a short notice to do more than indicate the scope of these papers; but for the purposes of diagnosis and the correct interpretation of *x*-ray shadows, they should be of value, even to experts.

REFERENCES.—[1]*Amer. Jour. Roentgenol.* 1921, 319; [2]*Ibid.* 1; [3]*Ibid.* 163; [4]*Brit. Med. Jour.* 1921, i, 6; [5]*Amer. Jour. Roentgenol.* 1920, 591; [6]*Californian State Jour. of Med.* 1920, Nov. (abstr. in *Amer. Jour. Roentgenol.* 1921, 42); [7]*Amer. Jour. Roentgenol.* 1921, 315; [8]*Bull. et mém. Soc. de Chir.* 1921, 528; [9]*Brit. Jour. Surg.* 1920, July, 18; [10]*Amer Jour. Roentgenol.* 1920, 421, 471; [11]*Ibid.* 1921, 186: [12]*Amer. Jour. of Med.* 1920, Nov., 639; [13]*S. Afric. Med. Record*, 1921, June, 223, and *Arch. of Radiol. and Electrotherap.* 1921, July, 47; [14]*Jour. de Radiol. et d'Electrol.* 1921, 256; [15]*Arch. of Radiol. and Electrotherap.* 1920, Oct., Nov., 141, 181; [16]*Radiol. Med.* 1920, 345: [17]*Jour. Amer. Med. Assoc.* 1920, Dec., 1534; [18]*Canad. Med. Assoc. Jour.* 1920, 1073; [19]*Brit. Med. Jour.* 1920, ii, 742; [20]*Wien. klin. Woch.* 1920, 853 (abstr. in *Surg. Gynecol. and Obst.* 1921, April, 287): [21]*Amer. Jour. Roentgenol.* 1921, 65; [22]*Ibid.* 134; [23]*Ibid.* 120; [24]*Ibid.* 71; [25]*Ibid.* 340; [26]*Ibid.* 343; [27]*Ibid.* 61; [28]*Arch. of Radiol. and Electrotherap.* 1921, March, 310; [29]*Ibid.* 1921, Feb., March, 257, 293; [30]*Lancet*, 1921, i, 29; [31]*Rev. d'Orthopédie*, 1921, Feb., 101; [32]*Bull. et Mém. Soc. méd. de Paris*, 1920, Dec., 454;

[33]*Rev. d'Orthopédie,* 1921, Jan., 31 ; [34]*Proc. Roy. Soc. Med.* (*Clinical Sect.*), 1921, March, 49 ; [35]*Jour. de Radiol. et d'Electrol.* 1921, 145 ; [36]*Bull. et Mém. Soc. anat. de Paris,* 1920, Oct., 533 ; [37]*Presse méd.* 1921, Feb., 123 ; [38]*Lyon. chir.* 1919, 573 ; [39]*L'évolution méd-chir.* 1920, 50 ; [40]*Rev. d'Orthopédie,* 1920, July, 365 ; [41]*Thèse de Paris,* 1920, and *Jour. de Radiol. et d'Electrol.* 1920, 471 ; [42]*La Chir. d. Org. d. Moviment.* 1920, iv, 141 ; [43]*Jour. of Anat.* 1921, July, 235 ; [44]*Bull. et Mém. Soc. de Méd. de Paris.* 1920. Dec., 456 ; [45]*Radiol. Med.* 1920, 83 ; [46]*Med. Jour. of Australia,* 1920, Jan., 73 ; [47]*Amer. Jour. Roentgenol.* 1920, 480 ; [48]*Johns Hop. Hosp. Bull.* 1921, March, 75 ; [49]*Surg. Gynecol. and Obst.* 1920, 111 ; [50]*Amer. Jour. Roentgenol.* 1921, 115 ; [51]*Arch. of Surg.* 1920, i., 184 (abstr. in *Surg. Gynecol. and Obst.* 1920, Nov., 391) ; [52]*Amer. Jour. Roentgenol,* 1921, 49 ; [53]*Ibid.* 259 ; [54]*Ibid.* 244 ; [55]*Jour. Amer. Med. Assoc.* 1921, 581 ; [56]*Lancet,* 1921, i, 13 ; [57]*Arch. of Radiol. and Electrotherap.* 1921, May, 363 ; [58]*La Clinica Castellana,* 1921. Feb. (abstr. in *Lancet,* 1921, i, 1255) ; [59]*Med. Record,* 1921, Jan., 6, and weekly to June 11.

YELLOW FEVER.

Sir Leonard Rogers, M.D., F.R.C.P., F.R.S.

Noguchi[1] has found that salvarsan preparations are not of any value against yellow-fever infections of guinea-pigs, although they have some effect on cultures of the *Leptospira icteroides* in vitro, but salvarsanized serum acts more slowly. On the other hand, anti-icteroides immune horse serum, in 1-c.c. doses of a 1–10,000 dilution, protected guinea-pigs from an infection with 5000 minimal lethal doses of the organism, while a 1–200 dilution of the serum produced agglutination and degeneration of the leptospira. P. P. Grovas[2] describes the clinical features of an outbreak of yellow fever at Vera Cruz and experimental work carried out there, including the infection of guinea-pigs by intraperitoneal injections of yellow-fever patients' blood taken during the third and fourth days of the disease, and the cultivation of the *Leptospira icteroides* from the guinea-pigs by Noguchi's method, and these animals were again infected from the cultures, thus confirming Noguchi's work, all the animals dying with symptoms similar to those of yellow fever. Underfeeding guinea-pigs predisposes to the infection. M. E. Connor[3] gives an interesting account of the control of yellow fever in Guayaquil, Ecuador, by anti-stegomyia measures. The most important breeding-places were tanks in houses, and within two months of effective measures to prevent extensive mosquito-breeding in such tanks, mainly by covering them with fine meshed wire, a rapid decline in the incidence of yellow-fever cases occurred, although other minor breeding-places, such as in pots, tins, etc., had not up to that time been dealt with. Small tanks containing only twenty-four hours' supply were substituted for larger ones when possible. In spite of the rainy season being on, the disease steadily declined and in a few months disappeared, and had remained completely absent for over twelve months at the time of writing. Small fish were of service in small water containers, such as barrels, in destroying mosquito larvæ. As the disease does not appear to be endemic in other towns of Ecuador, it is hoped that the disease has been stamped out of this small country.

H. Noguchi and I. J. Kligler[4] have isolated a strain of *Leptospira icteroides* from a case of yellow fever in Peru, which appears to be identical in its serum reactions with those obtained in other infected countries, thus confirming their earlier work. H. Noguchi[5] also publishes a general account of his studies on yellow fever, with microphotos of the causative organism ; this appears to be identical with that found in the kidney of a case of yellow fever in 1905 and named *Spirochæta interrogans* by Stimson, who thus appears to have been the first to discover the organism of yellow fever.

References.—[1]*Jour. of Exper. Med.* 1920, xxxii, 381 ; [2]*Jour. Amer. Med. Assoc.* 1921, i, 362 ; [3]*Ibid.* 1920, ii, 1184 ; [4]*Jour. of Exper. Med.* 1921, xxxiii, 239, 253 ; [5]*Amer. Jour. of Hygiene.* 1921, i, 118.

Miscellaneous.

THE EDITOR'S TABLE.

Samples (not returnable) and particulars for this section should be sent to The Editor, 'Medical Annual' Offices, Stonebridge, Bristol, on or before NOVEMBER 30.

We are anxious to express no opinion except as a result of practical knowledge, and it is owing to this fact that a notice in the MEDICAL ANNUAL *has come to be valued.*

NEW PHARMACEUTICAL PRODUCTS AND DIETETIC ARTICLES.

We are always ready, when a sufficient quantity is sent to us EARLY IN THE YEAR, *to arrange for these to be tested in hospital practice and reported upon; under other circumstances our knowledge is necessarily more limited; but frequently the simple information as to where a particular preparation can be obtained is all the practitioner requires.*

NEW MEDICAL AND SURGICAL INSTRUMENTS AND APPLIANCES.

We give Inventors and Manufacturers the opportunity of bringing their work before our readers entirely free of cost to themselves, subject only to the following conditions:—

(1) *Each article sent for notice must have the novelty or improvement claimed for it clearly stated upon a* SEPARATE *sheet or sheets of paper. This should have attached to it any illustration* (WHICH MUST BE SMALL) *for which insertion is desired, and also bear the maker's name. The attention of firms who send a large number of articles for notice is particularly directed to the above condition, as each article has to be sorted into its proper department before it can be considered.*

(2) *Medical Inventors should merely describe the instrument or appliance, and avoid giving technique of operations.*

The Editor is not able to accept reference to circulars, catalogues, or literature as a compliance with these conditions.

PROGRESS OF PHARMACY, DIETETICS, Etc.

Agar-agar Palatinoids.—This is a convenient method of using agar-agar for softening the fæces in chronic constipation. Its action is purely mechanical, and is particularly indicated when the fæces are hard and collect in the lower bowel. (Oppenheimer, Son & Co. Ltd., London.)

Anti-anthrax Serum.—This serum is obtained from the blood of animals that have been immunized against several strains of *B. anthracis*, in exactly the same way that antistreptococcus serum is produced. As anthrax is more frequently met with in veterinary practice than in human, this preparation has the greater vogue in animal medicine, but it is as suitable for human medication as if it were solely intended for that purpose. The dose for the human subject is from 30 to 40 c.c. administered hypodermically or intravenously. The serum is supplied in bottles containing 30 c.c. (Parke, Davis & Co., London.)

Antuitrin.—Antuitrin is a solution of the active principles of the anterior lobe of the pituitary body, specially prepared for hypodermic administration, which method appears likely to be more effective than the oral administration of the dry substance, since it obviates possible impairment by contact with the digestive secretions.

Antuitrin is employed in certain disturbances of metabolism, in delayed development (both mental and physical), and in derangements of the genito-urinary system. It has been favourably reported on in the obese type of sexually infantile pituitary dystrophy, suppressed menstruation, menorrhagia without apparent cause, osteomalacia, exophthalmic goitre, impotence in the male, premature senile decay, and bronchial asthma.

It is supplied in ampoules of 1 c.c. The dose is from 0·5 to 1 c.c. (Parke, Davis & Co., London.)

Balmosa is the name given to a methylsalicylate and menthol preparation which is efficient as an inunction in muscular rheumatism and for neuralgic pain. It is entirely absorbed by the skin. (Oppenheimer, Son & Co. Ltd., London.)

Benzyl Benzoate Capsules.—Benzyl benzoate possesses remarkable antispasmodic power, and has been highly recommended for the relief of conditions in which there is thought to be undue rigidity or spasm of unstriped muscular tissue. Amongst the many disorders in which good results have followed its administration are : excessive intestinal peristalsis (diarrhœa, dysentery), intestinal colic, enterospasm, cardiospasm, pylorospasm, spastic constipation, biliary and gall-stone colic, ureteral and renal colic, vesical spasm, spasmodic dysmenorrhœa, arterial spasm and angina, true asthma, hiccough, whooping-cough, and sea-sickness. The drug is of rather an irritating nature, to obviate which 5 min. diluted with an equal volume of oil are enclosed in soluble gelatin capsules. The dose is from 1 to 3 capsules. (Parke, Davis & Co., London.)

Benzyl Benzoate (Emulsio).—This preparation contains 5 min. of benzyl benzoate in each drachm, and is strongly recommended as a sedative and antispasmodic in intestinal and renal colics. It has been found a useful remedy for hiccough, and also relieves the paroxysms in asthma. Dose, ½ to 1 fluid drachm. (R. Sumner & Co. Ltd., Liverpool.)

Calcii Lactatis Elixir.—This is prepared by Messrs. R. Sumner & Co. Ltd., of Liverpool, in a strength 4 gr. to a drachm. It increases the coagulability of the blood, and has been found useful in the treatment of furunculosis, also of pruritus. In urticaria and chilblains this preparation has been employed with success. Dose, 1 to 4 drachms well diluted.

Coagulen-Ciba.—Coagulen is a physiological hæmostatic derived from normal blood, and contains the natural coagulating elements necessary for clotting the blood. It is indicated in all cases of external and internal hæmorrhage due to a deficiency of the coagulating power of the blood : epistaxis, hæmophilia, hæmorrhage from gastric or duodenal ulcer, melæna neonatorum, hæmorrhage from the gums, the lungs, the bladder, the uterus, as well as hæmorrhage during and after operations (tubinectomy, tonsillectomy). It has also been used as a prophylactic before such operations as are likely to produce severe hæmorrhage. (The Clayton Aniline Co. Ltd., 68½ Upper Thames Street, E.C.4.)

Dial is the name given to diallyl-barbituric acid, and is valuable as a hypnotic. It appears to be very free from secondary effects, and when given regularly over a period it does not induce habit. Its results are produced by a very small dose, which it is not usually necessary to increase in order to maintain the effect. (The Clayton Aniline Co. Ltd., London.)

Digifoline.—This contains all the glucosides of digitalis in their natural proportions, free from the saponins and other deleterious substances which are contained in the tincture. It is supplied in tablets and ampoules each representing 1½ gr. of digitalis leaf, and in a liquid of which 1 c.c. represents the same quantity as the tablet. Clinically its value is well proved and it can be recommended as a reliable preparation. (The Clayton Aniline Co. Ltd., London.)

'Emprote'.—We have recently been using 'Emprote' as a food for patients. It is very nourishing, containing as it does 36 per cent of protein, vegetable fat, salts, and vitamins. It is well assimilated and pleasing to the palate.

This is contained also in a variety of biscuits called by Mr. Eustace Miles, 'Wheat-emprote,' 'Training', and Plain. These are palatable and nourishing and are very suitable to take between meals or at night, or at any time when a light digestible food is required. They can be obtained from Mr. Eustace Miles, 40, Chandos Street, W.C.2.

Ferrous Phosphate.—Messrs. Oppenheimer, Son & Co. Ltd. have put up a bipalatinoid which contains ferric sulph. gr. ¾, and sodii phosph. gr. ⅜, with sodii carb., nux vomica, and quinine. They claim that, when administered, ferrous phosphate in a nascent form is produced by chemical combination. We think it would be desirable to order a certain quantity of water to be given with each dose to ensure the chemical combination.

The firm have also adopted the same method of obtaining a ferrous phosphate in their Cocoids Parrish (Parrish's food).

Ferruginous Syrup.—This contains the same ingredients as Parrish's food, but it is a pleasanter preparation, and one that is willingly taken by invalids and by children. Dose, ½ to 2 drachms. (R. Sumner & Co. Ltd., Liverpool.)

Gargarisma Formalin Co.—This is a most economical, efficient, and pleasant gargle and mouth-wash, containing formalin, glyc. acid carbolic, tinct. pyrethri, etc., suitably flavoured. It is highly concentrated, one fluid drachm being sufficient for an eight-ounce bottle. It has been employed as an antiseptic mouth-wash by dental surgeons for use after extractions, etc., and is also suitable for general purposes. (C. J. Hewlett & Son Ltd., 35–42 Charlotte Street, E.C.2.)

Heart Extract and Cholesterol (Standardized Solution of).—This antigen for use in the complement deviation (Wassermann) reaction for syphilis, consists of an alcoholic solution of heart muscle extract reinforced with cholesterol. It is prepared and adjusted by the same method, and to the same standard, as used for the production of the official antigen supplied to the War Office for use in military laboratories from 1917 to 1920. It is produced in the Pathological Laboratory, Cambridge, under the direction of W. Henwood Harvey, M.D., and is supplied to the profession by Messrs. Parke, Davis & Co., London, in bulbs of 1 c.c.

Hordine is a saturated solution of natural malt diastase, and can be used with advantage when malt preparations are indicated ; it is of special value in amylopsic dyspepsia. (Oppenheimer, Son & Co. Ltd., London.)

Hormone Palatinoids.—The following formula has been devised for *men* : pituitary gland $\frac{1}{20}$ gr., thyroid $\frac{1}{10}$ gr., carbon 1 gr., orchitin 1 gr. For *women* the following may be used : pituitary $\frac{1}{20}$ gr., thyroid $\frac{1}{10}$ gr., ovarian 1 gr., mammary 1 gr. Both these are put up by Messrs. Oppenheimer, Son & Co. Ltd., London.

Hormonigen.—Under this name, Messrs. C. J. Hewlett & Son Ltd., put up some tablets containing thyroid gland $\frac{1}{10}$ gr., pituitary gland $\frac{1}{20}$ gr., with ovarian and orchitic substance, and suprarenal $\frac{1}{10}$ gr. They are intended for cases of neurasthenia, and in menstrual and climatic disorders.

Iodinosol is a rapidly absorbed, non-irritant, non-staining preparation of iodine, issued in two strengths, namely 6 per cent iodine and 10 per cent iodine. When rubbed into the skin, iodinosol is rapidly absorbed and promptly assimilated. This can be readily demonstrated by rubbing a small quantity into the region of the median vein, and testing the urine for the presence of iodine 15 to 30 minutes afterwards.

This fact may be made use of in all cases needing the use of iodine internally. (E. T. Pearson & Co. Ltd., Mitcham, Surrey.)

Lactagol is a pleasantly-flavoured preparation of cotton-seed which, when taken by the nursing mother, increases the flow of maternal milk, at the same time enriching its quality. Furthermore, lactagol stimulates metabolism, thus improving the mother's health and enabling her, in the majority of cases, to breast-feed her baby without fatigue or overstrain.

Lactagol is in regular use in some 700 hospitals, municipal infant clinics, and similar institutions devoted to maternal and child welfare. (E. T. Pearson & Co. Ltd., Mitcham, Surrey.)

Mercurosal.—Mercurosal is an organic mercury derivative containing about 44 per cent of the metal, employed by intravenous or intramuscular injections in alternation with courses of organic arsenic in the treatment of syphilis. Chemically, it is di-sodium-mercuri-salicyl acetate, an amorphous powder, freely soluble in water to form a faintly alkaline solution which does not precipitate blood-serum. The toxicity of mercurosal is only one-seventh that of mercuric chloride.

The dose of mercurosal by intravenous injection is 0·1 grm. ; by subcutaneous injection it is 0·05 grm., and ampoules containing those weights of the powder are supplied.

As solutions are not perfectly stable they should be prepared at the time of use. (Parke, Davis & Co., London.)

Motorists' Soap.—Practically all doctors are motorists, and feel the need of a soap that will quickly remove dirt, grease, etc., after handling the mechanism of their cars. Messrs. R. Sumner & Co. Ltd., of Liverpool, have produced such a soap, and we find that it cleans the hands instantly. This is sold in bulk, at 3s. 6d. per lb., and in tubes, 1s. 3d. each.

Orchic Compound Tablets.—This combination is prepared to meet the demand that has arisen for a glandular preparation calculated to counteract premature senility and functional impotence in the male. It is also likely to prove useful in male cases of the Fröhlich type of adipose genital dystrophy in which sexual infantilism is evident. Each tablet contains 3 gr. of dried orchic substance (syn., orchitic or testicular substance), 1 gr. of dried anterior lobe of the pituitary body, and 1 gr. of dried suprarenal gland. The usual dose is 1 tablet three times daily. (Parke, Davis & Co., London.)

Oscol Stibium.—This is a colloidal solution equivalent to 1–2000 metal antimony. It appears to have given good results in bilharzia, and also in leprosy. In fact large quantities have been ordered from Oppenheimer, Son & Co. Ltd., for use in the leper institutions.

Dr. Causton, of Durban, recently wrote to the *British Medical Journal* recording excellent results from its use.

Ovarian Compound Tablets.—This combination is particularly applicable to cases of ovarian deficiency coupled with some degree of hyperthyroidism. It is indicated in certain cases of amenorrhœa, oligomenorrhœa, and even in menorrhagia and metrorrhagia if these symptoms are due to ovarian insufficiency. The strain of puberty and the difficulties of glandular readjustment in cases of surgical or natural menopause may often be relieved by a glandular combination such as this. Each tablet contains 2 gr. of dried ovarian substance, 1 gr. of dried suprarenal gland, and 1 gr. of dried pituitary body. The dose is 1 or 2 tablets three times daily. (Parke, Davis & Co., London.)

Oxycyanide of Mercury Tablets.—At the suggestion of Col. Harrison, The Holborn Surgical Instrument Co. Ltd. now make oxycyanide of mercury tablets, one of which in $\frac{1}{2}$ pint of water forms a solution 1–4000, a convenient strength for V.D. work.

Pa-mol Ointments.—Pa-mol is a hydrocarbon base which is not readily absorbed, and is therefore useful for its emollient and surface action. Messrs. Reynolds & Branson Ltd., of Leeds, put up a number of ointments with this base. The following is a very useful formula: acid. salicyl., camphor, acid. carbol. āā gr. x, sulph. præcip. gr. xv, pa-mol ad ℥j. Another likely to be of use is: hyd. ammon. gr. x, liq. picis carb. ♏xxx, pa-mol ad ℥j.

Parathyroid Tablets.—These tablets are prepared from the glands of cattle, carefully dissected out with special precautions to avoid inclusion of extraneous material. Each contains $\frac{1}{10}$ gr. of the dried substance.

It is found that insufficient function of the parathyroid glands (e.g., in epilepsy or tetany, or consequent upon the destruction or injury of the glands during the operation of thyroidectomy) may be compensated by administering parathyroid substance from cattle; but it must be genuine, and the minute size of the glands renders it difficult to ensure this. Messrs. Parke, Davis & Co., London, guarantee that at least 90 per cent of their product is genuine parathyroid tissue.

This substance has given very good results in cases of paralysis agitans, tetany, and exophthalmic goitre. A recent article in the *British Medical Journal*, 1921, ii, 687, reported great benefit in cases of varicose ulcer, varicose eczema, and chronic gastric ulcer, presumably due to the influence of the gland on calcium metabolism.

Peptone Capsules, Medicinal.—Each of these capsules contains 2 gr. of peptone in fine powder, readily soluble, and constituting an excellent means for the oral administration of foreign protein, either to produce a marked systemic reaction, or to induce by very small doses tolerance to some anaphylactic agent. This treatment has been found very effective in certain forms of asthma and migraine, and for preventing urticaria of anaphylactic character following the ingestion of certain albuminous foods. The dose is 1 to 4 capsules before meals thrice daily. (Parke, Davis & Co., London.)

Peristaltin.—This is the soluble laxative glucoside of cascara sagrada. It stimulates peristalsis without acting as a drastic purgative and causing gastro-intestinal irritation. It is best taken two to four times a day, the tablets being most convenient; or it may be used hypodermically in post-operative intestinal paralysis, for which purpose ampoules are provided. They have proved of so much value in many cases that they well deserve a trial. (The Clayton Aniline Co. Ltd., London.)

Phytin.—This is obtained from plant seeds, and contains 22·8 per cent of organically combined assimilable phosphorus. This is a much larger phosphoric content than lecithin, which has only 3·8 per cent.

It can be given in all conditions in which it is necessary to increase the weight and restore vitality to the organism. It should prove a valuable remedy in true rheumatoid arthritis when the muscles have lost their tonicity and resiliency. It can be used with success in all conditions of debility.

It is supplied in tablets, and also as 'granular phytin', by The Clayton Aniline Co. Ltd., London.

Pil. Anti-tuberculosis.—This pill was suggested by a general practitioner; the idea is a very sound one. Extract of thyroid gland is known to influence the formation of antibodies: nuclein and oil of cinnamon promote both phagocytosis and leucocytosis, while calcium iodide is the recognized drug for internal administration in the treatment of ulcers.

This pill contains these ingredients, and is made by Messrs. R. Sumner & Co. Ltd., Liverpool.

Protein Test Outfit.—Messrs. Duncan, Flockhart & Co., of Edinburgh, have made the protein test more easy of adoption by the preparation of an outfit which meets all requirements. They have put up all the ordinary proteins likely to be required in glass capillary tubes, sterilized and ready for use, and also the control test, which it is necessary to use. Each set of proteins is accompanied by an ejector of soft rubber. The practitioner can select the particular proteins he wishes to test. The arrangement is very convenient and practical.

Roboleine.—We have previously called attention to this excellent food, of value in all cases of wasting diseases. The combination of red bone-marrow, malt, and egg-yolk, is good in itself, but Messrs. Oppenheimer, Son & Co. Ltd. have now added neutralized lemon-juice, which not only makes it more palatable but also supplies vitamins, which add to its food value.

Salicylosol is a rapidly absorbed, non-irritant liquid containing 10 per cent salicylic acid. This preparation enables the physician to administer salicylic treatment by inunction in those cases where aspirin or the salicylates, given by the mouth, cause nausea or other symptoms of gastric irritation. The absorption is rapid and complete. The assimilation is prompt, with consequent promptitude in obtaining physiological effects. It has been employed in rheumatism, gout, sciatica, and lumbago. (E. T. Pearson & Co. Ltd., Mitcham, Surrey.)

Sensitized Serum for Sheep's Corpuscles.—This preparation (which is also termed hæmolytic serum) for use in complement-deviation reactions, using sheep's corpuscles as the indicator, is prepared in the Pathological Laboratory, Cambridge, under the direction of W. Henwood Harvey, M.D., and is supplied to the profession by Messrs. Parke, Davis & Co., London, in bulbs of 1 c.c.

Suprarenal Compound Tablets.—Each tablet contains 1 gr. of dried suprarenal gland, 1 gr. of dried pituitary body, and ½ gr. of dried thyroid gland, a combination of those glands that control the kinetic drive of the body and have important functions in maintaining the normal metabolism. The administration of these tablets is indicated in cases of thyroid, pituitary, and suprarenal deficiency, in cretinism, myxœdema, in enuresis, in dry and scaly skin diseases, in the toxæmia of pregnancy, in obesity due to thyroid insufficiency or to pituitary insufficiency, in adipose genital dystrophy, and in cases of suprarenal exhaustion following acute infections. The dose depends upon the tolerance of the patient for thyroid medication. (Parke, Davis & Co., London.)

MEDICAL AND SURGICAL APPLIANCES.

Bed-frame, Surgical.—This is the clever and practical invention of Mr. Robert Morison, 2, Lauriston Terrace, Edinburgh. It is a portable tubular bed-frame scientifically constructed, and can be readily placed over any make of standard-sized hospital bed and used in the treatment of all fractures where the patient is confined to bed. The frame itself can be set in any position relative to the bed, and does not require to be fixed to it. It is especially suitable for treating femur and other lower-limb fractures, and affords a ready means of suspension, traction, and the attainment of any posture in any of the limbs.

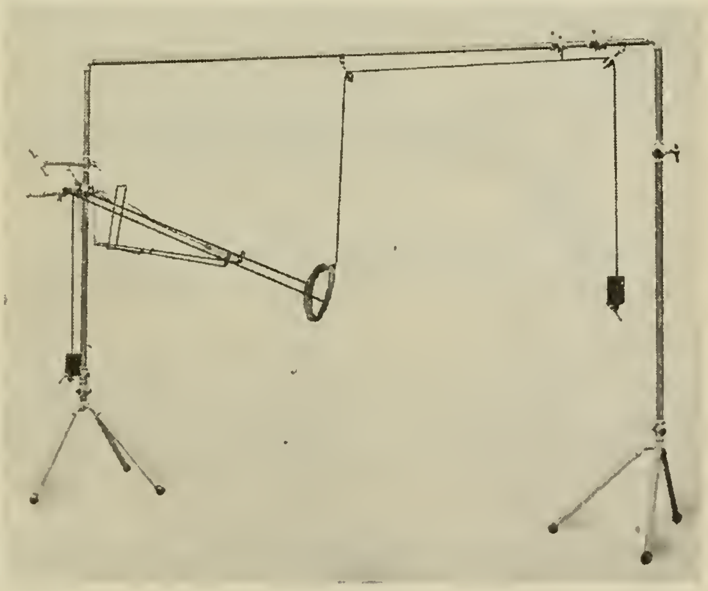


Fig. 90.

Tubal arms can be placed in the sliding crossheads and readily fixed at the desired height or position. These support splints or slings, and carry pulleys for traction. The universal pulley provided with frame is easily adjusted and fixed, and will take the pull of the cord from any angle.

The standardization of the fittings of the bed-frame is an outstanding feature, all parts being interchangeable. The working of the frame is simple and can be adapted to suit the various methods adopted in the modern treatment of fractures. The frame tubes are readily separated for transit, and are easily rebuilt and mounted without the use of any tools.

The illustration (*Fig.* 90) shows an R.I.E. bed-frame with a Thomas splint and knee, flexion appliance in position for treating a fracture of the femur.

The bed-frames are made with different sets of accessories according to requirements. A simple set with the real essentials for treating a fractured femur can be supplied for £7.

Belt, Hypogastric.—In cases of corpulency where the abdomen is pendulous, and in cases of women where the womb is pressed on the bladder, great relief and comfort can be given the patient by the use of a proper belt. For many years we have used the hypogastric belt (*Fig.* 91) of The 'Domen' Belts Co. Ltd. It not only gives great support, but it also exercises level pressure just above the pubes by means of flexible steel springs and a well-cushioned pad (*Fig.* 92). The relief given by this support in suitable cases is immediate and surprising. A symptom most frequently cured is a chronic pain in the lower part of the back, of which the general enteroptosis is the unsuspected cause. (The 'Domen' Belts Co. Ltd., 456, Strand, W.C.2.)

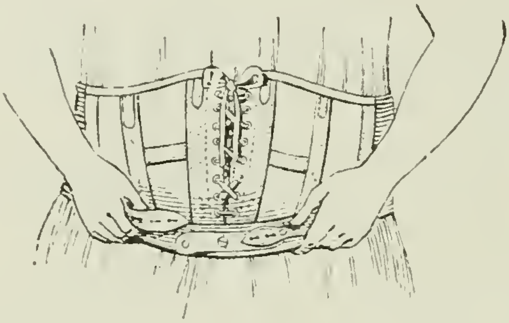


Fig. 91.

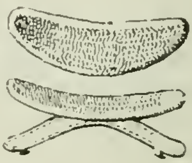


Fig. 92.

Catheter.—This pattern is designed by Dr. M. W. Browdy, who says that: "In the treatment of chronic posterior urethritis all operators are aware of the difficulty of localizing the instillation to the spot desired, and unless considerable skill is used the fluid is either injected into the bladder or into the anterior urethra, with unsatisfactory results. I have had made a solid-ended catheter, 8 in. in length (*Fig.* 93), with a universal holder to fit an ordinary 20-minim record syringe. Down the centre of the instrument passes a fine bore which opens into a hollow notch, 1 in. in length, placed on the convex side of the catheter curve. When the instrument is *in situ* the verumontanum projects into this concavity, and so can be treated: while on slightly withdrawing the instrument the remainder of the posterior urethra can be dealt with." The Holborn Surgical Instrument Co. Ltd. are the makers.

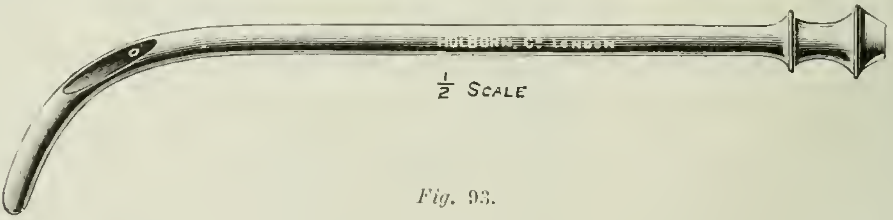


Fig. 93.

Catheter Holder.—In order to facilitate the introduction of a catheter into the fundus uteri, Dr. Remington Hobbs has devised a catheter holder, as illustrated (*Fig.* 94). It is a light, handy instrument, and owing to its size and to the bend in the shank, the line of vision of the catheter is not obscured. When the catheter has been inserted, the lumen of the tube is not obliterated, so that the fluid can be syringed through whilst the tube is retained *in situ* by the holder. It is used by Dr. Hobbs in the treatment of gonorrhœa, and is made by Mr. J. H. Montague, 69, New Bond Street, W.1.

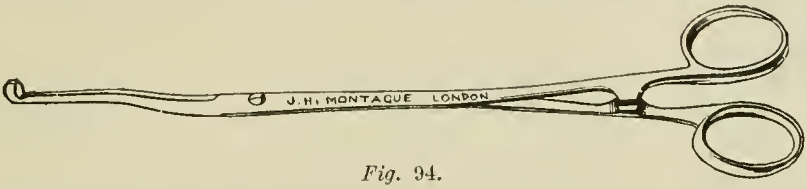


Fig. 94.

Douche, Collapsible.—A douche apparatus with a rubber collapsible container is very useful to ladies when travelling or staying in hotels, and also convenient, on occasions, for the surgical bag. The container has a vulcanite stay which gives it rigidity, and all the necessary appliances for irrigation are well thought out, and supplied. The general construction will be understood from the illustration (*Fig.* 95). The price is 25s. (Mr. W. Holman, 29, Beauchamp Place, Brompton Road, S.W.3.)

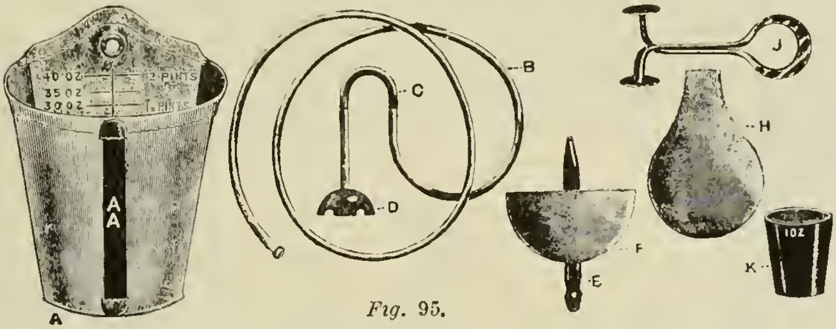


Fig. 95.

Drop-bottle (Metaline).—This consists of a stout outer metal case, nickel-plated, in which an amber-coloured bottle is fixed; the union between the neck of the bottle and metal outer case is effected by means of a metal cement, and evaporation of the contents is entirely obviated. The bottle is graduated to 16 drachms (*Fig.* 96), and a window is provided in the outer case so that the contents can be easily seen. It is fitted with Symon's stopper and cap, with spare washers. Messrs. A. E. Braid & Co. Ltd., 30, Gower Place, W.C.1, supply this at 10s. 6d.

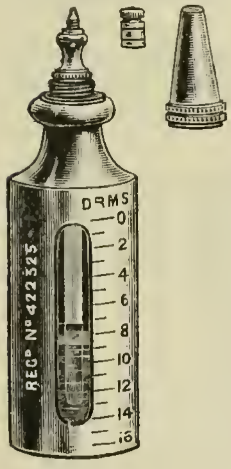


Fig 96.

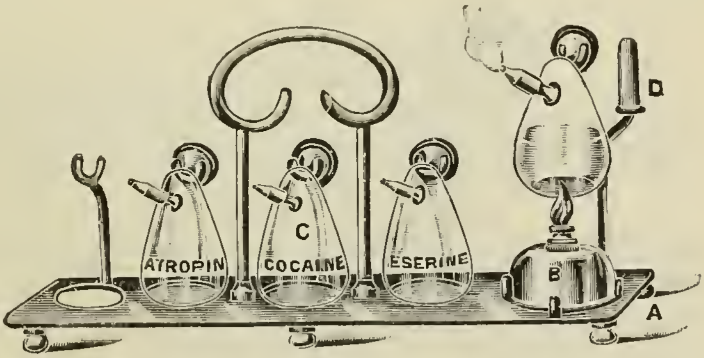


Fig. 97.

Drop-bottles, Eye (Luzardis).—These are made in four colours, amber, blue, green, and clear flint glass, engraved with name of solution. The dropper is very finely pointed and fitted with a ground-glass protection cap. The flow of drops is regulated by pressure on the rubber disc cap at the back of the bottle.

The set of four bottles is mounted on a plated metal stand, which is made with a holder for a metal spirit lamp and stand for holding drop-bottles containing solution over the flame of the lamp (*Fig.* 97).

This set is portable and compact, making the bottles always ready for immediate use. Price per set, 40s. Spare bottles can be engraved at 3s. 3d. each. (A. E. Braid & Co. Ltd., 30, Gower Place, W.C.1.)

Dropper.—This was designed by Dr. R. Donald for use in the Wassermann test. It is used at the L.G.B. Laboratory, and also at the Military Hospital, Rochester Row; by its means a great deal of time can be saved and a uniform drop obtained. (*Fig.* 98.) (The Holborn Surgical Instrument Co. Ltd.).

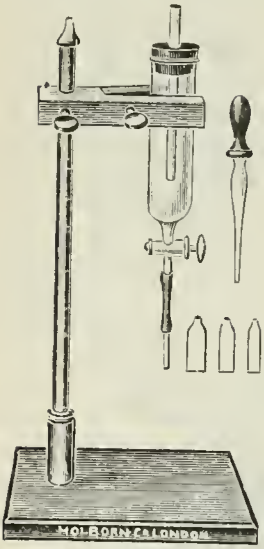


Fig. 98.

Endoscopic Apparatus.—This is a combined electroscope and endoscopic tube (*Fig.* 99), with interchangeable proximal and distal lighting for direct laryngo-tracheo-bronchoscopy and œsophagoscopy, designed by Dr. Irwin Moore.

The important feature is that both proximal and distal lighting is combined in one instrument, and their interchange possible whilst the endoscope tube is *in situ*, without disturbing its position or necessitating its withdrawal, at the same time ensuring an enlarged field of vision and intensity of light for illumination, which can only be satisfactorily obtained with tubes of large diameter.

The advantages are obvious. The mechanism allows of the easy passage and free manipulation of instruments under direct inspection, without obstructing the field of operation; again, if the patient coughs, the mirror may then be instantaneously switched out of the way, and therefore is not soiled by coughed-up material.

Also, by dispensing with the mechanism by means of which the handle is rotated from side to side in Brunings' instrument, displacement of the distal end of the endoscopic tube, which frequently occurs, is prevented. (Messrs. Mayer & Phelps, London.)

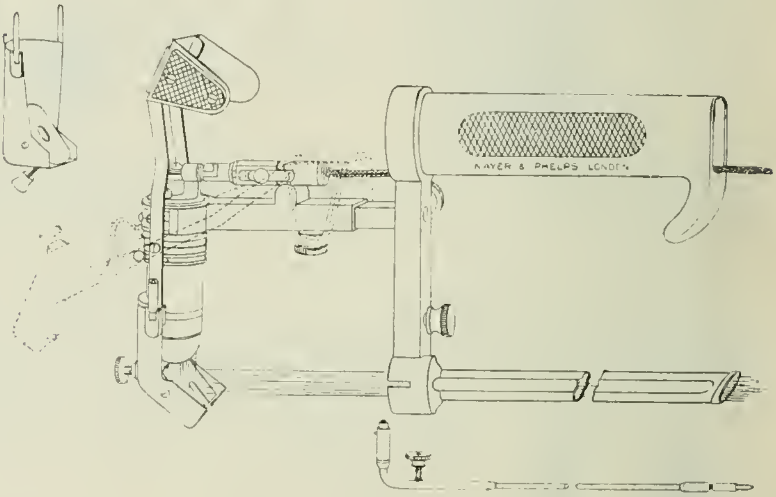


Fig. 99.

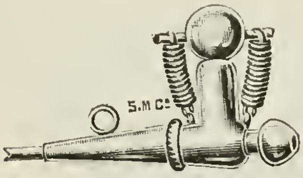


Fig. 100.

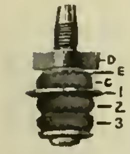
Eustachian Tube Catheter Appliance.—We illustrate here (*Fig.* 100) a mount for injecting oil, etc., into the Eustachian tubes without removing the catheter, suggested by Dr. Hastings. It is silver-plated and costs 9s. 6d. (The Surgical Manufacturing Co. Ltd., 83–85, Mortimer Street, W.1.)

Filtering Candles (Germ-proof).—The modern filter consists of a hollow cylinder of baked porcelain, closed at one end, through which the water percolates. These cylinders are fitted into the filter case by a metal or earthenware nipple attached to the open end, the cylinder and nipple together being known as the candle, or bougie. The candles, however, must be sterilized periodically by autoclaving, and here arises a difficulty, inasmuch as the expansion caused by the heating of the different materials which form the candle varies, and causes defects in the joint which render the candles unreliable after sterilization.

In the new patent candle introduced by The London Filter & Pump Co. Ltd., Sharpleshall St., Regent's Park, N.W.1, this difficulty is eliminated by the adoption of a nipple furnished with expansile washers which, when tightened by means of a screw-nut, are forced out sideways until they close hermetically the inner walls of the cylinder, thus forming an absolutely impervious joint. The illustration (*Fig.* 101) makes the mode of action plain.

An additional advantage of this arrangement is that the cost of candle renewals is greatly reduced because the detachable nipple can be used for an indefinite number of cylinders without damage.

Careful experiments have been carried out in autoclaving by steaming under a pressure of 120° C., and repeated many times during a period of three months with one specimen; at the end of the period the joint was still perfect. This device marks a great advance in filter candles. They are moderate in price, varying from 6s. 10d. in the largest size to 4s. each in the smallest: or for renewal cylinders 5s. 6d. to 3s. each respectively. They are supplied to fit any of the standard patterns of the principal makers of candle filters.



Hare-Lip (Splint for).—Dr. Lester Samuels has suggested the splint illustrated (*Fig.* 102) as an aid to obviating deformity and disfigurement after operation for hare-lip, in the form of keloid thickening or a notch at the lower end of the scar. The author uses Czerny's sutures for the mucous side of the lip in order to minimize tension, and applies the splint, which is made of silver, in the following manner: The splint is sutured to the upper lip with silkworm gut passed through the two holes in the body of the splint. A circular suture is taken through the lip at the point of juncture, and two sutures each side at a distance of ½ inch. These last are fastened to the rings on the downward-projecting arm, which stands away from the plane of the transverse portion at an angle of about 15° so as not to interfere with feeding. The stitches are fastened to the rings under slight tension, thus pulling the lip forward and downward at the site of operation. This imparts a slight downward curve, which subsequent contracture will correct to the normal line. (Down Bros. Ltd., London, S.E.1.)

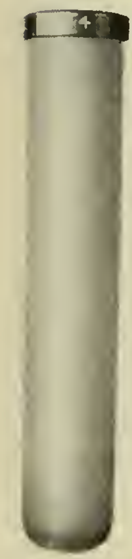


Fig. 101.

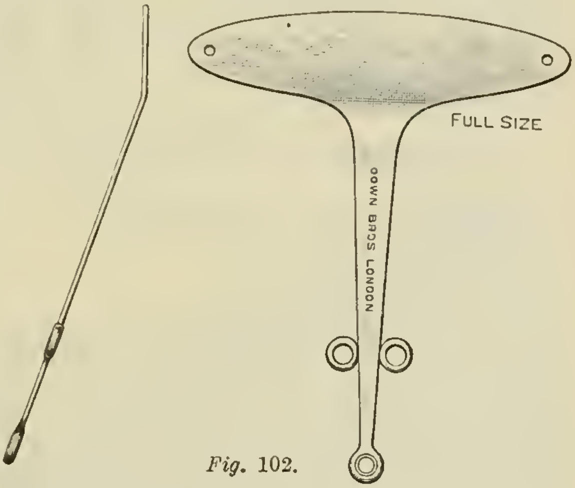


Fig. 102.

Hypodermic Syringes.—The *Sterilizer 'Record' Syringe Case* (*Fig.* 103) produced by The Surgical Manufacturing Co. Ltd., 83–85, Mortimer Street, W.1, is a distinct and practical novelty. It is put up complete with spirit lamp and a syringe to hold 10 c.c. or 20 c.c. at 21s. and 25s. respectively. It is therefore remarkably inexpensive as well as practical.

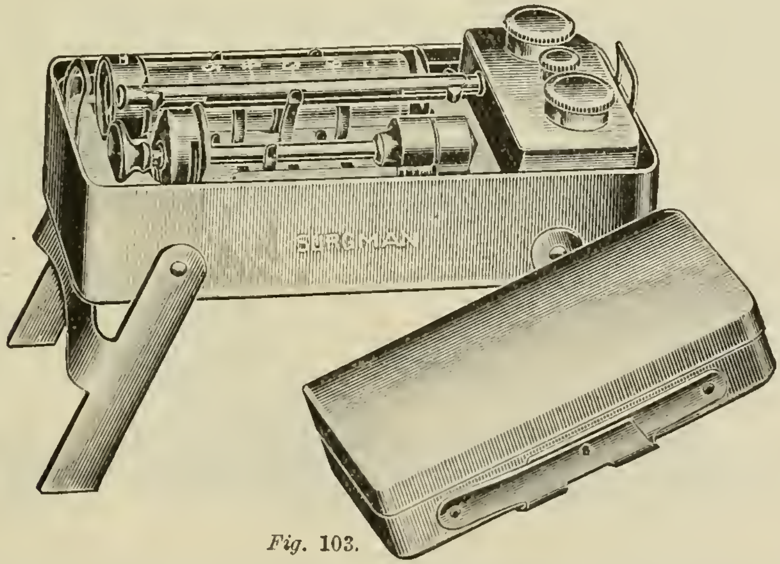


Fig. 103.

The New 'Record' Hypodermic Syringe.—Messrs. R. Sumner & Co. Ltd., of Liverpool, send us a sample of the latest improvement in 'Record' Syringes.

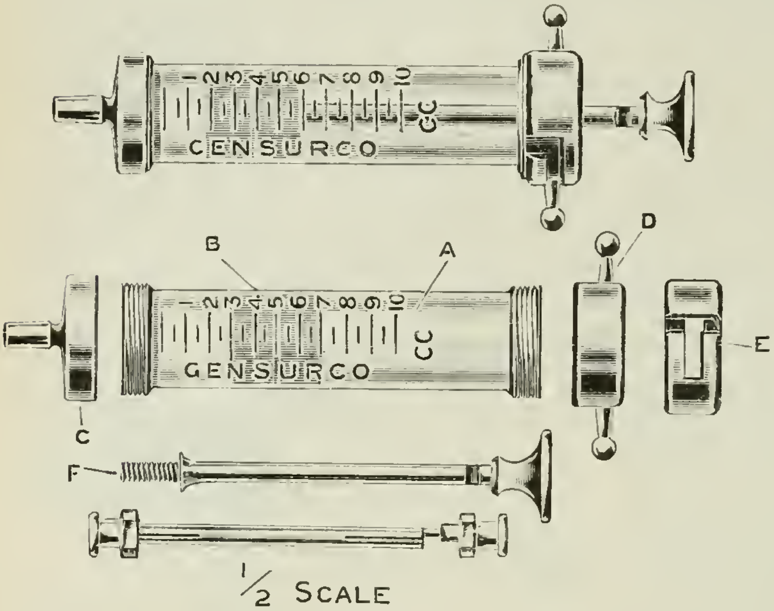


Fig. 104.

When a syringe becomes a casualty, it is nearly always due to a broken barrel. It certainly can be repaired, but usually at some expense and after a lapse of considerable time. The new 'Record' obviates this difficulty; as will be seen from the illustration (*Fig.* 104), the barrel is entirely detachable, merely screwing into each end of the syringe, and, as it is of standardized calibre, a new barrel can be obtained at once, and at small cost, and the syringe is restored to use within a day or so. This new syringe is also provided with a standard nozzle, so that the needles are interchangeable through the whole range of sizes of this pattern. The price of the 20-minim hypodermic is 15s., and of the 10-c.c. serum syringe 21s. They are entirely of the best British manufacture.

Syringe with Peripheral Nozzle.—The Holborn Surgical Instrument Co. Ltd. now construct these syringes wholly of glass (*Fig.* 105). This makes them more efficient from the aseptic point of view, and is also an economy in manufacture, but there is some risk of the glass nozzle breaking unless used with care.

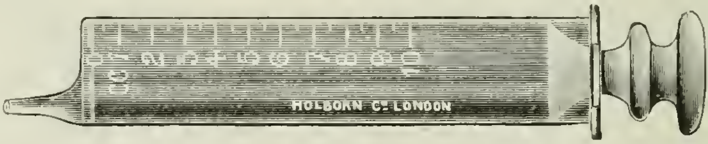


Fig. 105.

'Record' Syringe (New Type)—This is a new type of 'Record' syringe (*Fig* 106). The plunger is made of a black glass composition and therefore does not cause the glass barrel to crack during sterilization. This point is of some importance, and the syringe can be recommended.

Fig. 106.

Fig. 107 shows another new model 'Record' syringe. The annoyance of the glass barrel cracking during sterilization is usually due to the difference in expansion of metal and glass. The above syringe reduces this risk to a minimum, as the metal plunger can be drawn clear of the glass barrel without taking it right out.

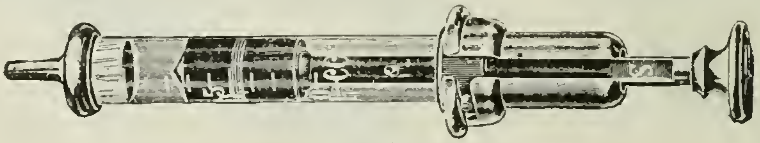


Fig. 107.

Both these syringes are stocked in various sizes from 20 min. to 20 c.c. by The Holborn Surgical Instrument Co. Ltd., London.

Hypodermic Needle Case (*Figs.* 108, 109).—This is an excellent method of carrying spare hypodermic needles. It is a small clip case which preserves the needle and occupies little space.

The Surgical Manufacturing Co. Ltd., London, W.1, supply a case containing 4 'Record' hypodermic needles for 2s. 6d., or with 6 'Record' serum needles 5s.

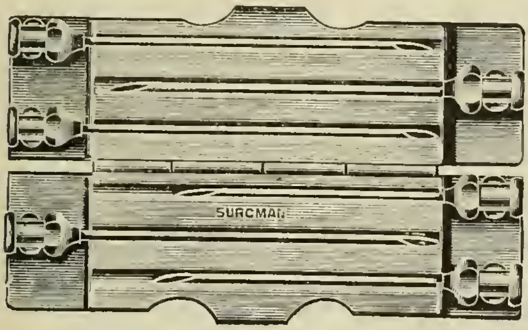


Fig. 108. Open.

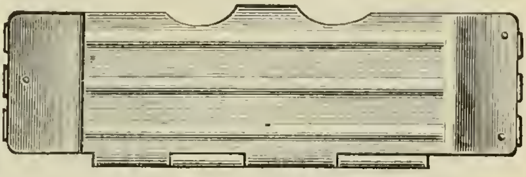


Fig. 109. Closed.

Inhalers.—In the *Semi-automatic Nitrous Oxide Inhaler* the gas is released by pressure of the patient's thumb working against a spring. As pressure is relaxed the gas is automatically cut off at the cylinder.

The pressure of the gas on the tube acts in combination with a spring in the stopcock in closing the valve of an automatic regulator attached to the cylinder. The gas is immediately available, and is completely shut off without any attention to the cylinder valve. It is primarily for use in midwifery, also for painful dressings and minor operations.

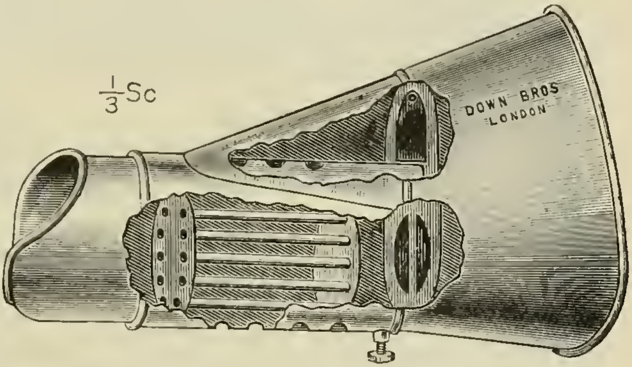


Fig. 110.

We illustrate an *Ether Inhaler* (*Fig.* 110) made to the design of Dr. G. A. Ticehurst. It consists of three parts: a face-piece carrying the usual rubber cushion and provided with inspiratory and expiratory valves, a radiating chamber containing nineteen thin metal tubes, and a container for sponge or gauze upon which the ether is dropped. Ether is inspired from the container through the warmed 'radiator' tubes, while the expired breath is directed by the expiratory valve through a short passage into the radiating chamber, where it passes between the tubes, to which it gives some of its heat, and escapes through holes in the opposite side. With the radiating chamber in use the temperature rises in the course of a few minutes to 65°–75° F., occasionally higher. There is a considerable economy of ether over the use of a mask, and a welcome diminution in the amount of ether in the air surrounding operator and anæsthetist. (Down Bros. Ltd., London, S.E.1.)

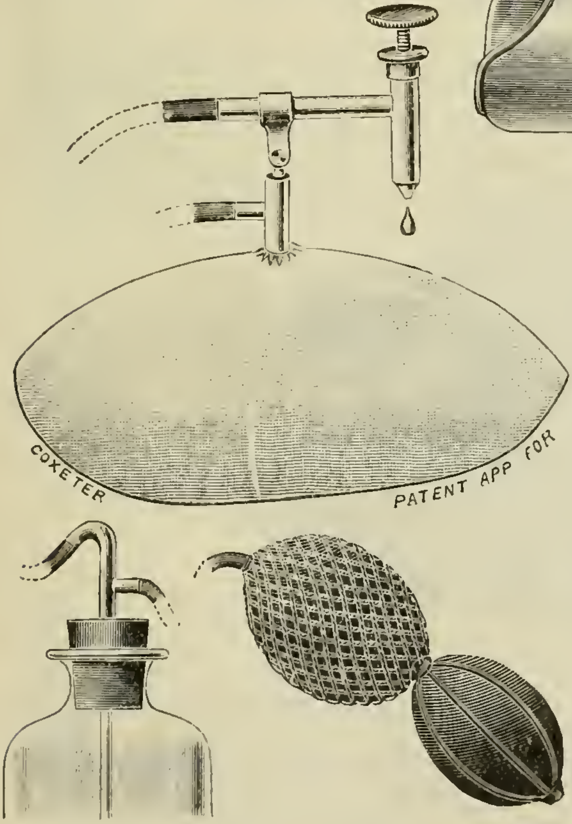


Fig. 111.

Sight Feed Ether Inhaler (*Fig.* 111).—This is an inhaler comprising mask with 6 flannel covers; adjustable sight feed with fine adjustment control; metal 3-way tube with rubber stopper to fit ether stock bottle; large rubber hand bellows, and rubber tubing.

The mask has a perforated central tube for use with chloroform vapour when required. When the bellows are fully inflated the anæsthetic continues to drop for a considerable time without attention.

Intratracheal Ether Inhaler.—This inhaler by Coxeter & Son comprises an ether bottle with new-pattern regulating valve, water jacket, manometer, mercury safety valve, and hardwood tray with fittings, tubing, metal mount for catheter, and electric heater with lamp, 12 ft. cord, and plug. The heat is regulated by the adjustment of the position of the lamp. The water jacket and the ether vapour delivered to the patient are thus both maintained at a constant temperature.

Laryngoscopic Mirrors.—The Surgical Manufacturing Co. Ltd. send us a set of laryngeal mirrors (*Fig.* 112) of various sizes in a metal box, with a metal holder to which they can be quickly and firmly attached. They are a great improvement upon the old form of laryngeal mirror, and can be easily kept aseptic. We think our readers will like them. The set costs 12s. 6d.

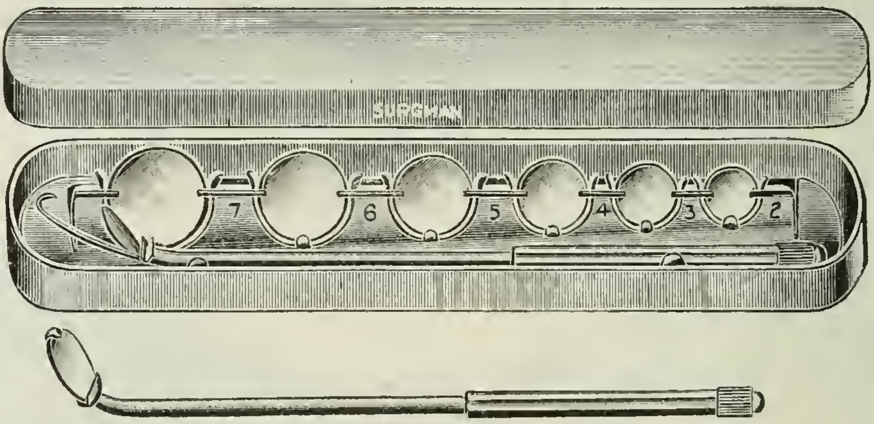


Fig. 112.

Midwifery Case.—This is made of finest quality cowhide leather, lined with pegamoid (which can be washed), and is fitted with a removable, washable drill lining (*Fig.* 113).

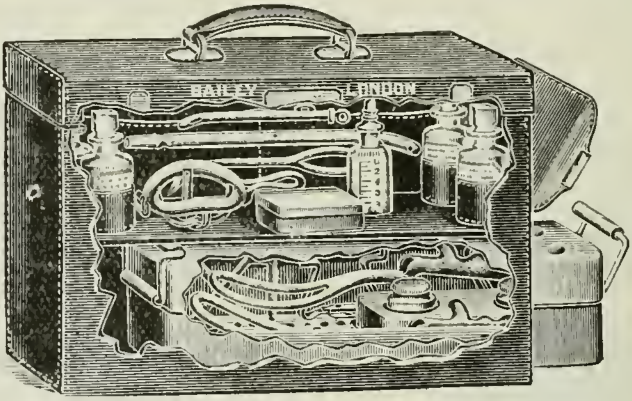


Fig. 113.

The bottles are fitted into nickel-plated cases, with a spring arrangement which prevents the stoppers becoming loose, and the sterilizer is large enough to take axis-traction forceps, as well as other instruments.

This case should appeal to every practitioner on account of its convenience and portability. Messrs. W. H. Bailey & Son, London, are the manufacturers.

Puncture Needle, Self-registering.—We illustrate here (*Fig.* 114) a very clever invention and one of great practical importance, made by Dr. Guillermo Zorraquin, of Buenos Aires. It is designed automatically to prevent the puncture being carried beyond the cavity.

It will be seen that the needle is fitted with a projecting cannula (B) controlled by a spring (C) in the handle (D). When in use the cannula is automatically pushed back, exposing the point of the needle, and at the same time the nozzle (E) stands away from the handle.

Directly the point of the needle enters a cavity the cannula will spring forward. This will be indicated to the operator by the nozzle (E), which will spring forward at the same time.

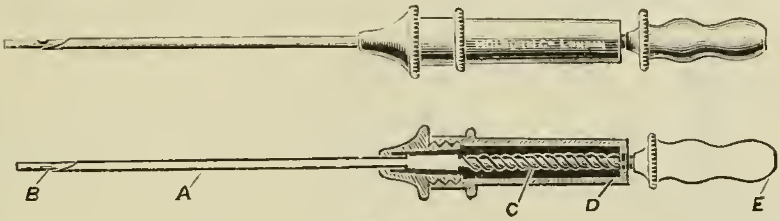


Fig. 114.

Dr. Zorraquin claims that this needle is of great use in pneumothorax operations, and that it avoids injury to the lung, the point of the needle being protected by the blunt cannula. He considers that it facilitates the exploration of the pericardium, and is useful for penetrating a vein, also for intraperitoneal injections, and for emptying an ascites.

It is made in four sizes, ·6 × 30, ·7 × 35, ·8 × 40, ·9 × 45, and 1·0 × 50 mm., by The Holborn Surgical Instrument Co. Ltd., London, W.

Needle, Blood-collecting.—This is a new-shaped blood-collecting needle (*Fig.* 115) as made for the Medical Department of the New Zealand Government; it admirably meets the purpose for which it is intended. (The Holborn Surgical Instrument Co. Ltd., London.)

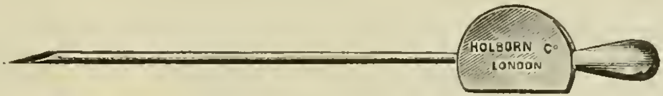


Fig. 115.

Oxygen Injector.—Devised by Mr. J. E. Roberts, F.R.C.S., for abdominal radiography, this apparatus (*Fig.* 116) comprises a stout rubber bag with net cover, an electric heater, a glass bulb filter containing cotton-wool, and a needle with obturator. The bag is filled with oxygen from a cylinder.

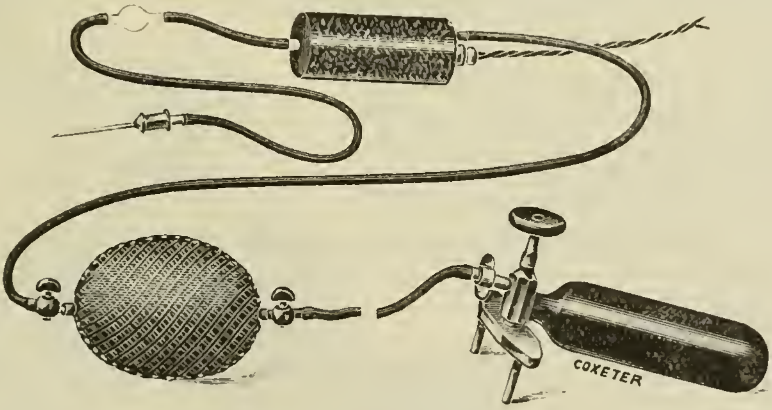


Fig. 116.

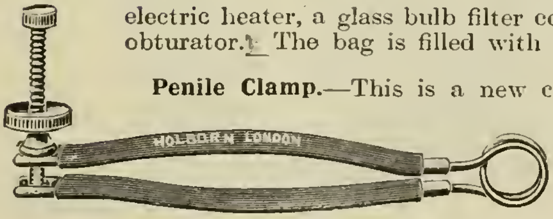


Fig. 117.

Penile Clamp.—This is a new clamp made at the suggestion of Dr. H. Wansey Bayly, and is a vast improvement on other clamps on the market, most of which are made with a spring, and hurt the patient.

The clamp (*Fig.* 117) is covered with rubber which can be renewed from time to time, and the pressure can be regulated to a nicety by the screw. It is specially useful in the abortive treatment of gonorrhœa. (The Holborn Surgical Instrument Co. Ltd.)

Pessary, Improved Rigid Napier's Stem.—Messrs. R. Sumner & Co. Ltd., of Liverpool, are now supplying an improved pessary (*Fig.* 118). The usual rubber stem is rendered more rigid by a concealed nickel non-rusting metal rod—this gives a greater degree of support and comfort to the patient than the original model. The under-straps are detachable for cleaning and replacement.

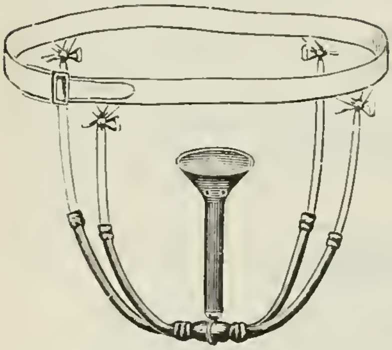


Fig. 118.

Photomicrographic Apparatus. — We illustrate here (*Fig.* 119) the central part of a photomicrographic apparatus that Messrs. Reynolds & Branson Ltd. have supplied to a large number of laboratories, and which has been found to give every satisfaction. Whether used in the horizontal or vertical position it gives perfect rigidity. For illumination, the Rystos arc lamp may be used, or when continuous current is available a Pointlite electric lamp is effective. The whole apparatus is very complete in every detail.

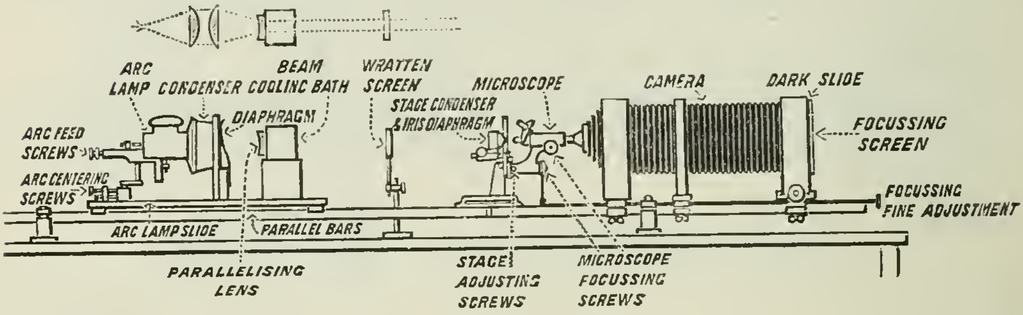


Fig. 119.

Pneumothorax Apparatus (Artificial).—This apparatus, a modification by Dr. Geoffrey Marshall of that of Morelli, of Pavia, is portable and easily manipulated. As shown in the illustration (*Fig.* 120) the whole apparatus is conveniently arranged in a portable case, measuring 19½ × 8 × 4¼ in. One end of the case is hinged to lie flat, thus bringing the manometer upright, when all parts will be found ready for use. The gas reservoir is a small rubber bag of 400 c.c. capacity attached to a 3-way tap. This tap is connected with the manometer and with the rubber tube carrying the induction needle. A safety trap on the distal limb of the manometer prevents spilling, and cotton-wool filters are inserted where required in the circuit. The reservoir is filled with air, nitrogen, or oxygen by the 3-way tap on the left side of the apparatus so as to be almost full but not distended. Then the 3-way tap is closed and the manometer taps only opened. The needle is then introduced. When the manometer indicates that the needle is in the pleura the 3-way tap is turned on so as to give the gas. By closing the 3-way tap from time to time changes in the intrapleural pressure during the induction can be observed. As the intrapleural pressure rises, the flow of gas tends to stop. The injection can be continued at this point by

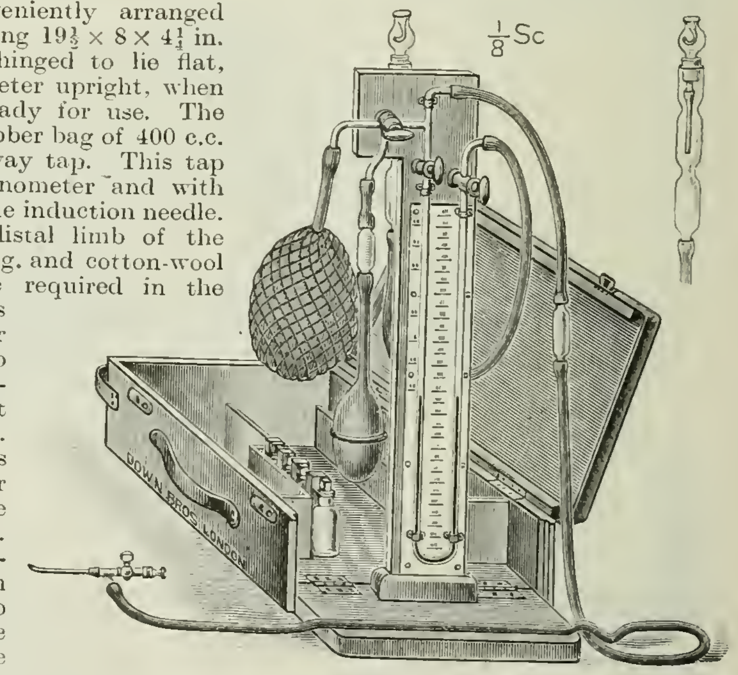


Fig. 120.

gentle compression of the bag. If required the bag can be refilled during the operation. The author recommends Clive Riviere's cannula for primary inductions, and a short special needle for refills. Four stoppered bottles are provided in the case for ether, tinct. iodi, novocain, and collodion. (Down Bros. Ltd., London, S.E.1.)

Messrs. Reynolds & Branson Ltd., of Leeds, have sent us particulars of the apparatus suggested by Dr. H. de Carle Woodcock for producing artificial pneumothorax which has been long used in the Leeds hospitals. We give an illustration of the apparatus (*Fig.* 121) which shows it in position for inserting the needle, with the taps closed. The apparatus is quite portable, and fitted with a metal cover which is readily removed from the stand and gives complete accessibility.

Many improvements have been made on the original apparatus, and a description of the present one, with full details of the best method of operating, is supplied by the makers. The cost complete is £12 12s.

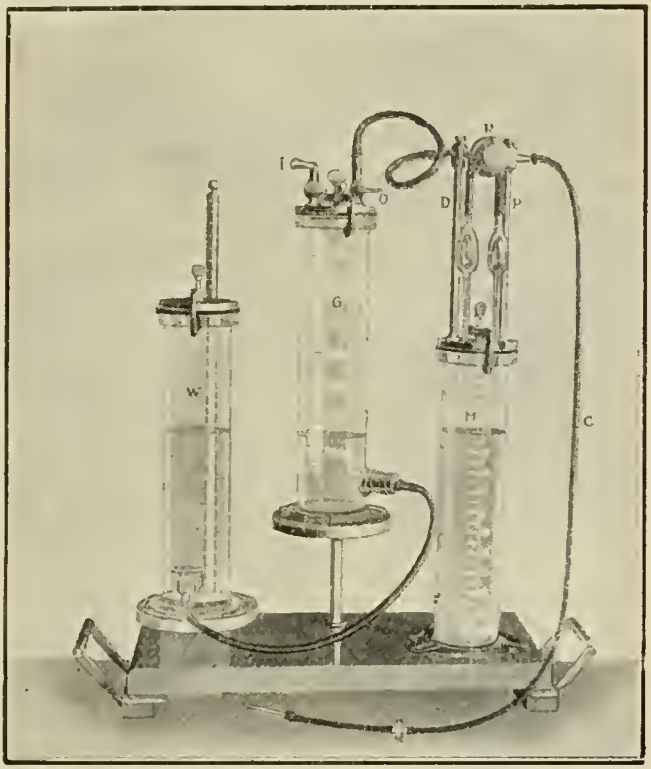


Fig. 121.

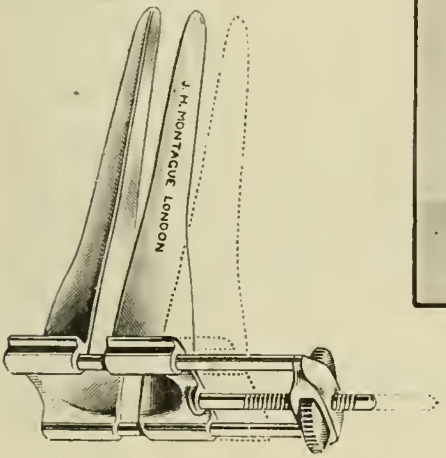


Fig. 122.

Speculum.—*Fig.* 122 is a speculum with parallel movement, as used by Dr. Malcolm Simpson in cases of vulvovaginitis in children, in the clinic of the London Hospital. (J. H. Montague, 69, New Bond Street, W.1.)

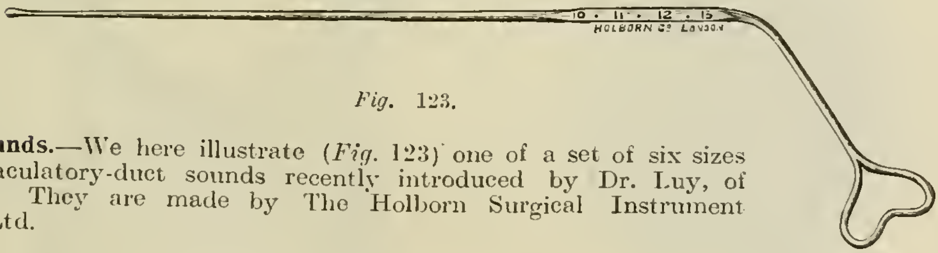


Fig. 123.

Sounds.—We here illustrate (*Fig.* 123) one of a set of six sizes of ejaculatory-duct sounds recently introduced by Dr. Luy, of Paris. They are made by The Holborn Surgical Instrument Co. Ltd.

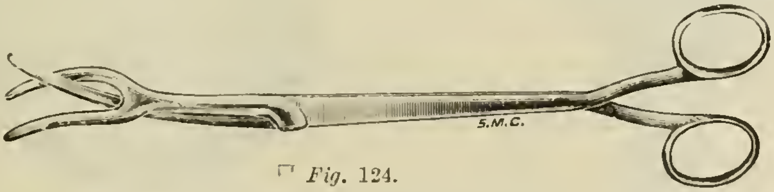


Fig. 124.

Sterilizer Forceps.—This is a good pattern of forceps for swabs and instruments, produced by the Surgical Manufacturing Co. Ltd., 83–85, Mortimer Street, W.1. It is made in several sizes. The 10½ in. length costs 6s. 6d. (*Fig.* 124.)

The Surgical Manufacturing Co. Ltd. also make forceps with large grip (*Fig.* 125),

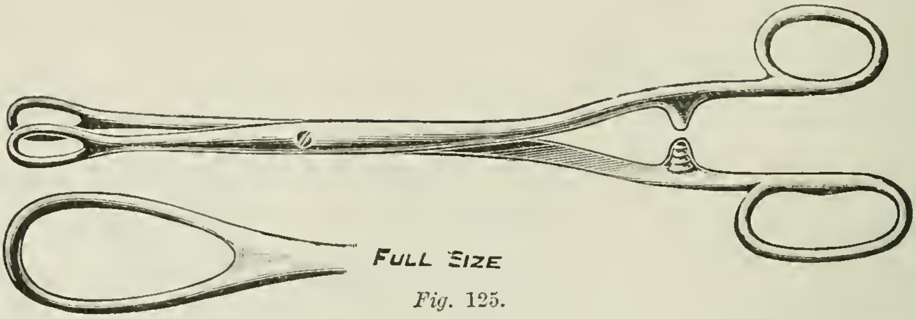


Fig. 125.

which renders them more convenient to use than those of the ordinary pattern, and can be recommended.

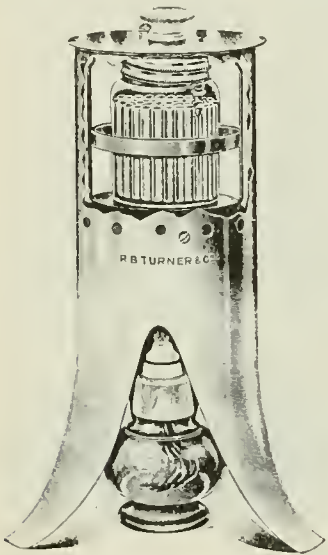


Fig. 126.

Sterilizer for Steel Needles.—This appliance is designed by Dr. A. G. Shera, and is an excellent attempt to solve what may be called the problem of the hypodermic needle. The object is primarily to prevent pain on injection, and, secondly, subsequent deterioration of needles. The apparatus consists of a tripod nickel-plated steel sterilizer (*Fig.* 126), 8·5 in. high, with an upper chamber 3 × 2·75 in. In this upper chamber is a bottle of forty needles, supported by their hilts in open glass tubes, the points being free. The bottle is one-third filled with liquid paraffin. Heat is supplied by a spirit lamp below, and sterilization occurs in twelve to fifteen minutes and is shown by boiling of the paraffin, which causes an audible metallic tinkling at approximately 118° C.

The apparatus is intended for the practitioner, and especially for V.D. clinics and hospital wards. Re-sterilization is unnecessary once a bottle has been opened if due asepsis is observed, provided the needles are used fairly soon. Far greater economy in needles and comfort to the patient can be obtained with needles sterilized and lubricated in this way than under ordinary conditions. (Messrs. R. B. Turner & Co., 7–14, Eagle Street, Southampton Row, W.C.)

Stethoscopes.—Dr. William C. Minchin, of Sheerness, has invented a novel form of stethoscope. The accompanying illustrations (*Fig.* 127) show the form of the chest-piece. The inventor claims that it is of special service in the examination of bed patients and prostrate subjects who cannot be exposed to a prolonged examination

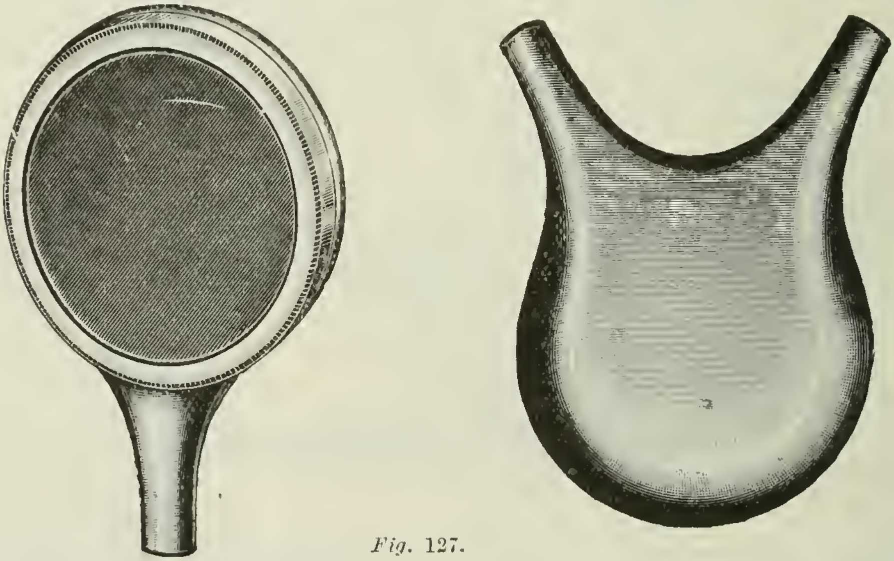


Fig. 127.

or much disturbance in position. The chest-piece is set at right angles, and can be introduced under clothing if necessary. The appliance is about the size of a lady's watch, and can easily be carried in the pocket. It is convenient in the auscultation of the chest in children. Price 10s. 6d. each.

Under the name of the 'Triplex' Chest-piece all the usual methods of auscultation are embodied in one instrument. It may be used as phonendoscope or stethoscope, or with the vulcanite mount and a single plug. These can be rapidly used in turn to obtain an accurate diagnosis. It is well made, and the cost is only 15s., including protector for phonendoscope.

Another instrument, called the Revolving Stethoscope (*Fig.* 128), has a chest-piece which rotates so that either the phonendoscopic end can be used or the ebonite mount for the intercostal spaces, and they can both be used at varying angles with the tubes, which is an advantage.

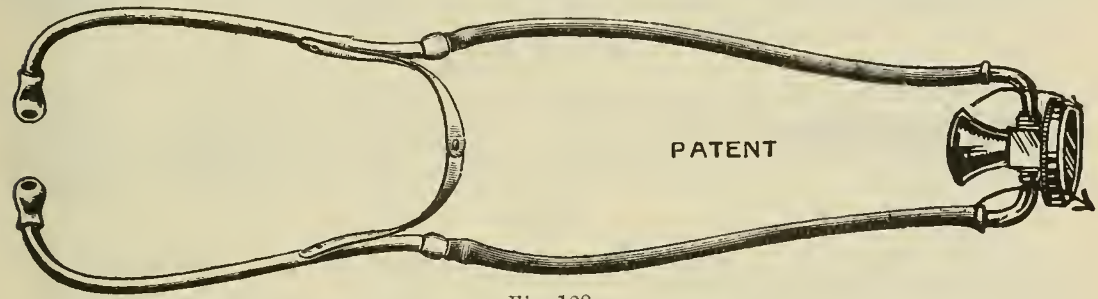


Fig. 128.

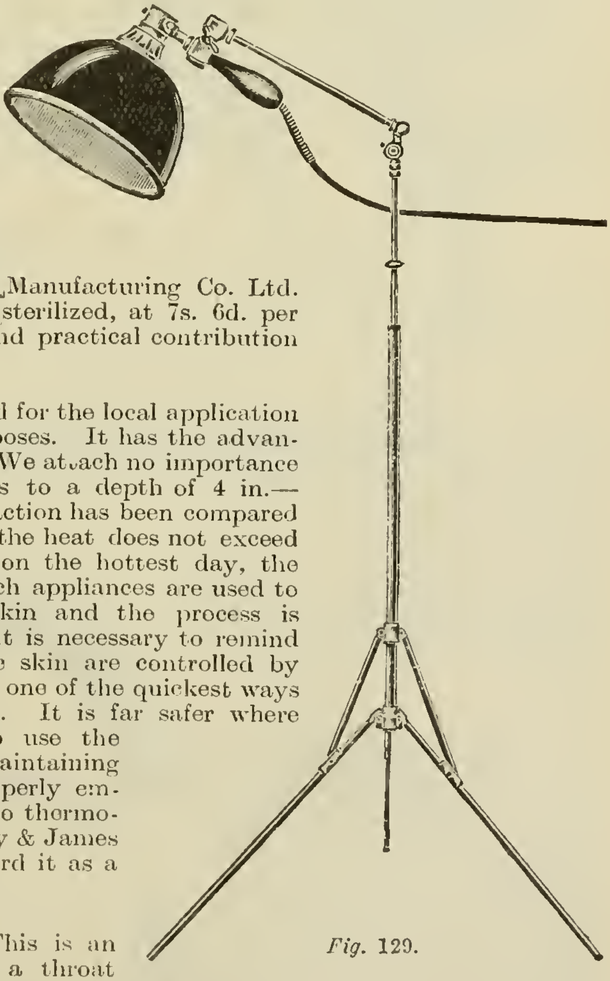


Fig. 129.

The tubes are fitted with external plugs which preserve the lumen of the tube the same throughout. The face-piece is modified so that the tubes lie close to the head and fit the ears without undue pressure. The cost is 20s.

All these are supplied by Messrs. A. E. Braid & Co. Ltd., 30, Gower Place, W.C.1.

Tents, Sea Tangle.—The Surgical Manufacturing Co. Ltd. put these up in single tubes, ready sterilized, at 7s. 6d. per dozen. This is a most convenient and practical contribution to our requirements.

Thermolite Lamp.—This is intended for the local application of heat and light for therapeutic purposes. It has the advantage of reflecting its rays in parallel. We attach no importance to the claim that the heat penetrates to a depth of 4 in.—" probably to a greater depth." Its action has been compared with that of sunlight, and so long as the heat does not exceed that normally produced by the sun on the hottest day, the comparison is possible; but when such appliances are used to produce active hyperæmia of the skin and the process is continued for twenty minutes daily, it is necessary to remind our readers that the functions of the skin are controlled by its nerves, and that excessive heat is one of the quickest ways of injuring their functional capacity. It is far safer where high temperatures are required to use the Thermolite Lamp as a means of maintaining the heat of a moist compress. Properly employed it will prove a useful adjunct to thermotherapeutic treatment. Messrs. Menley & James Ltd., 64, Hatton Garden, E.C.1, regard it as a useful aid to iodex treatment.

Throat Brush in Glass Tube.—This is an excellent arrangement for carrying a throat brush in a sterile condition and for avoiding contamination. The brush is in a glass tube well corked with a boxwood top. The arrangement only costs a shilling, and solves a practical problem. Thus, if used to paint with iodine the brush can be carried home without fear of staining. (A. E. Braid & Co. Ltd.)

Thermometer, Clinical Aseptic.—This is a novel arrangement by which the clinical thermometer is contained in a glass tube, with its bulb resting on a spring (*Fig.* 130). It has a screw cap, and when this is released the thermometer springs into position for removal. By keeping some antiseptic, e.g., ac. carbol. 5 per cent, in the lower part of the tube the thermometer is always kept aseptic. It is best carried in the erect position, and might be furnished with a clip like a fountain pen.

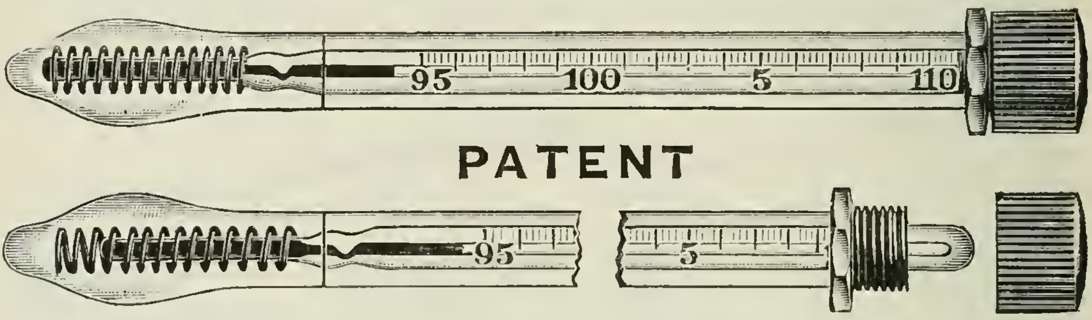


Fig. 130.

This solves the problem of keeping the thermometer antiseptic while being carried on the daily round. (A. E. Braid & Co. Ltd., 30, Gower Place, W.C.1.)

Tongue Depressor with Electric Light.—This is a tongue depressor furnished with an electric lamp, worked with a pocket 4-volt battery.

It is a very practical instrument for illuminating the throat while the tongue is depressed. It costs complete with battery 13s. 6d. (A. E. Braid & Co. Ltd.)

Tonsil Hook.—This modification of Boettcher's hook has been made for Mr. A. M. Zamorra, to enable a tonsil to be extracted without any such damage as may impair the accuracy of the result of the subsequent bacteriological examination. In the removal of actually diseased tonsils by seizing with vulsellum forceps, etc., the substance of the gland is crushed or bitten through, modifying the distribution of its contents to an extent that invalidates subsequent examination. This hook (*Fig.* 131) will deliver the most difficult types of tonsil approximately in their original condition. (Down Bros. Ltd., London, S.E.1.)

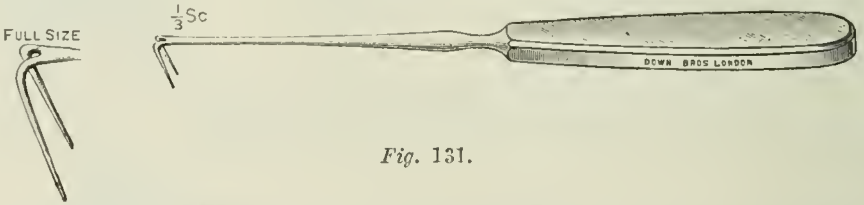


Fig. 131.

Tracheotomy Tubes and Forceps.—The tracheotomy tube here shown (*Fig.* 132) has been made to the design of Mr. A. Cubley. The channeled pilot permits respiration during introduction, a feature that secures the further great advantage that in this way immediate indication is given when the tube is in the trachea. The smooth flat shield

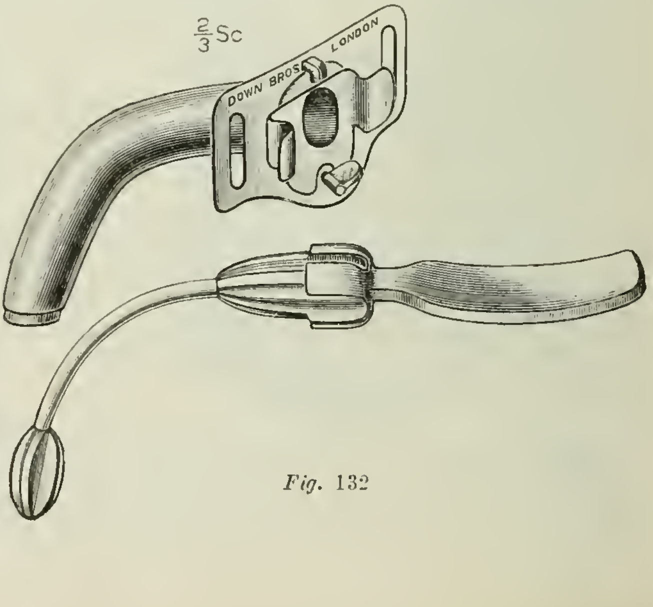


Fig. 132

from which wire loops and crevices have been eliminated is made of a stronger gauge silver than is the ordinary Parker's tube, and is detachable for thorough cleansing. The removal of the outer tube from the shield for cleansing is facilitated by a simple device, and the catch retaining the inner tube in position is strongly made and secured to avoid its becoming detached, and is of a convenient site for manipulation.

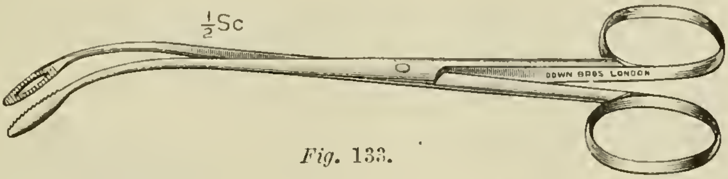


Fig. 133.

The Flase membrane forceps (*Fig.* 133) are sufficiently slender to pass down the trachea of a young child: the joint has been placed farther back than usual, so that the points open easily when far down the trachea. (Down Bros. Ltd., London, S.E.1.)

Urological Basin.—Dr. Walter J. Ronan has designed a urological basin (*Fig.* 134) which he finds useful in the treatment of urethritis and cystitis when irrigation is required. It fits firmly between the thighs without causing undue pressure on the posterior urethra, which sometimes occurs when other appliances of the same nature are used. Flanges cover the inner surface of the thighs, and no splashing or leaking over the sides can occur. It will hold more than three pints of fluid, and therefore does not require to be emptied during treatment. It is made of enamelled iron, and therefore can be sterilized by boiling. (J. H. Montague, 69, New Bond Street, W.1.)

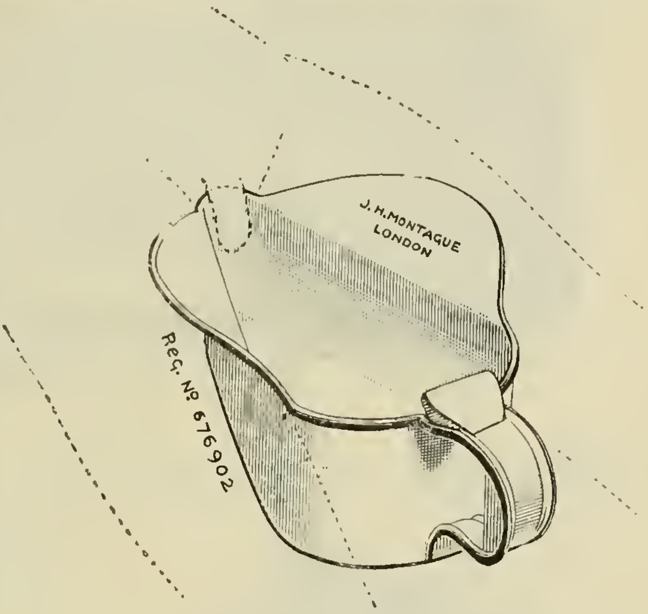


Fig. 134.

Urethral Spatula.—The illustration (*Fig.* 135) shows a spatula for taking specimens from the female urethra as made for Col. Harrison. The pattern is a copy of one he saw in use on the Continent, and it is a very useful little instrument. (The Holborn Surgical Instrument Co. Ltd.)

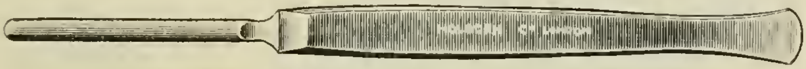


Fig. 135.

Urethroscope Tube for the Posterior Urethra.—Capt. F. C. Doble writes: "The difficulty in obtaining a simple urethroscope by means of which one can examine the posterior urethra has no doubt been experienced by many surgeons, and for this reason I am calling attention to a special tube that I have lately had made to fit my Holborn urethroscope, by means of which one can get a very clear view of the floor of the posterior urethra.

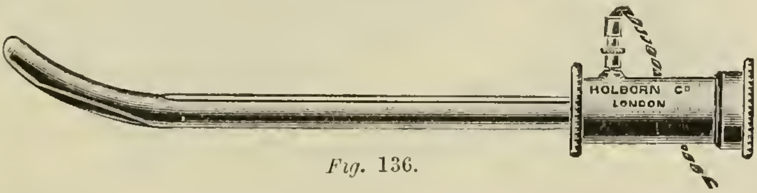


Fig. 136.

"The urethral tube as illustrated (*Fig.* 136) is rather more than 7½ inches long and of 26 French catheter gauge. It is curved at the end, and has an opening 1¼ inches long in the convex surface of the bend. This opening is completely filled by the pilot when introducing the tube, and I find it causes very little bleeding or discomfort to the patient. The tube is made to fit the body of the Holborn urethroscope, and lengthening pieces are supplied for the lamp-holder and instruments, to make up for the extra length of the posterior tube.

"The lens used is a large single one ⅞ inch in diameter, and does not require any adjusting or focusing, as is necessary with the more complicated and expensive instruments, and one can get a very much better view. The tube can also be used with the operating body, thus enabling one to carry out in the posterior urethra any necessary treatment as easily, and with just as good an illumination, as in the anterior urethra.

"I have found the Holborn urethroscope a most useful instrument, but hitherto it was suitable for the anterior urethra only. The addition of the posterior tube I have described above will, I feel sure, very much enhance its value." (The Holborn Surgical Instrument Co., Ltd.)

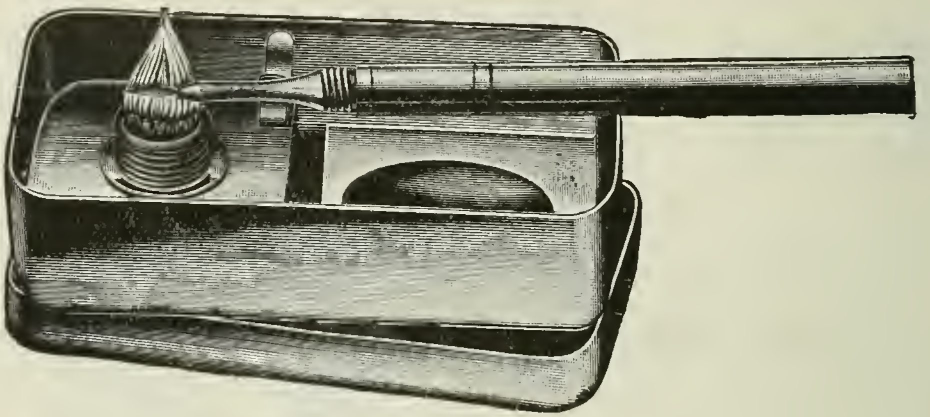


Fig. 137.

Vaccination Case.—This is a particularly handy set for a general practitioner, consisting of a vaccinator with platino-iridium point, an indiarubber lymph-ejector, spirit lamp, and diluting slab. All in a small and compact case (*Fig.* 137). Nothing could be handier or more efficient. Price 15s. (Messrs. R. Sumner & Co. Ltd., Liverpool.)

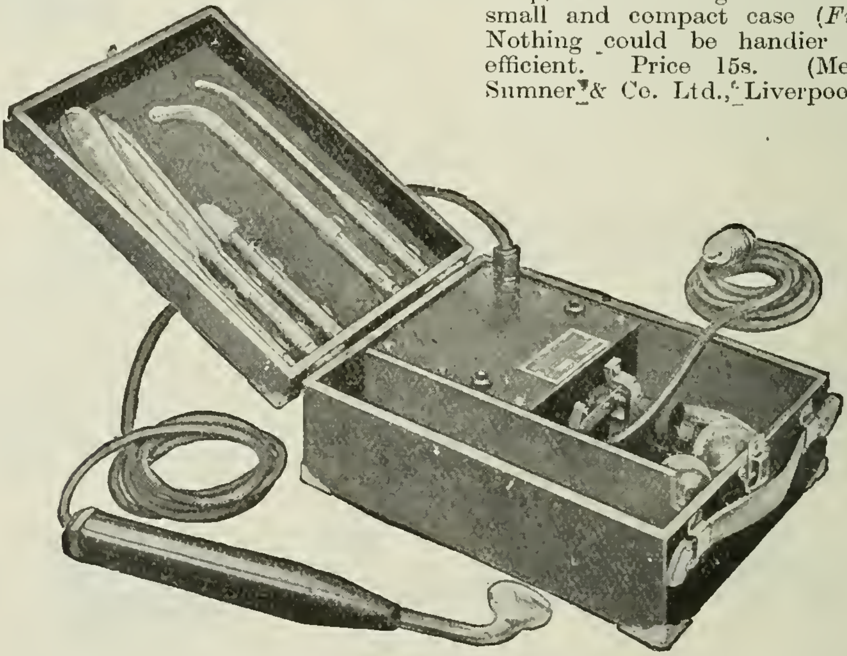


Fig. 138.

Violet-ray High-frequency Generators.—We illustrate here (*Fig.* 138) a really portable high-frequency outfit brought to our notice by The Rogers Electric Sales Co., 31, Craven Street, W.C.2. The coils are mounted in a carrying case measuring 11¼ × 8¼ × 5 inches. The case is covered in leathcrette reinforced with nickel-plated metal corners and lined with velvet ; or it can be supplied in oak or mahogany. Ample space is provided for seven electrodes, handle, and connecting cord, which are detachable. The coils are wound to produce very high voltage and oscillation and generate sufficient heat (ampèrage), operating by either direct or alternating current. The complete outfit weighs only 5½ lb., and will be found efficient and durable.

The same firm also supply a Table Set, the 'De Luxe' Model (*Fig.* 139), which has a bracket for holding the handle, plated towel rails. and a drawer for holding accessories.

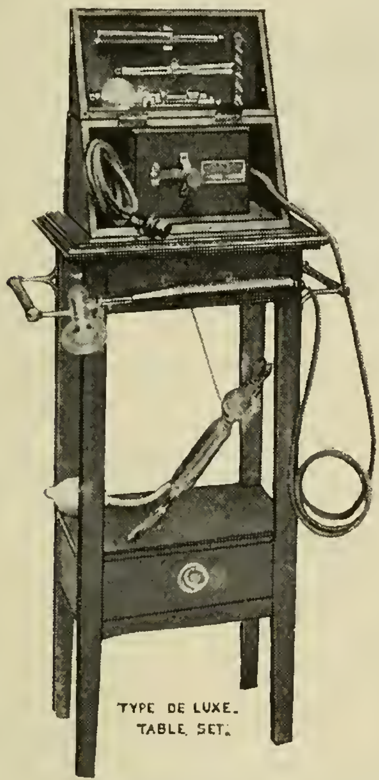


Fig. 139.

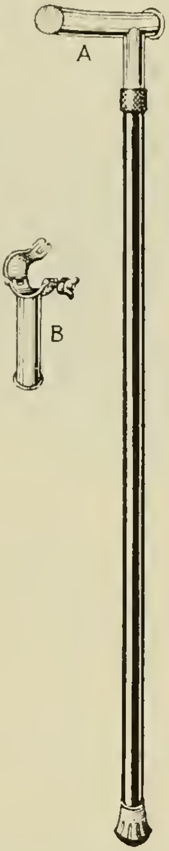


Fig. 140.

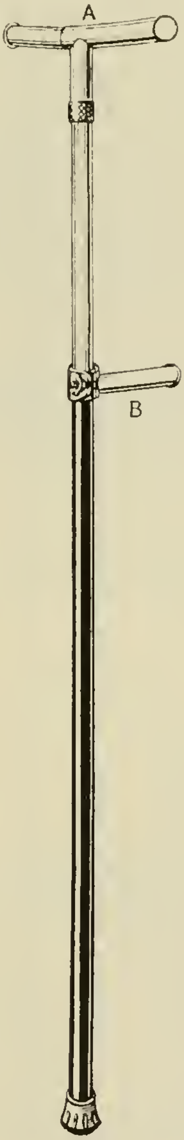


Fig. 141.

Walking-stick and Crutch, Combined.—A walking-stick that can be made into a crutch in an emergency is most useful for those who have artificial legs, as small accidents do happen to artificial limbs ; for instance, the tendon breaks, or the foot portion goes out of action, and the patient, perhaps in the street, is only able to get along with great difficulty. Again, periodically the stump becomes sore, and a rest is beneficial. This patent walking-stick, the invention of an ex-soldier with an artificial leg, is converted in a moment into a crutch, and should be a boon to those who wish to lead as active a life as possible with an artificial leg. The illustrations (*Figs.* 140, 141) show how simply the conversion is made. (Messrs. R. Sumner & Co., Liverpool.)

X-ray Apparatus.—The great advantage claimed for this *Radiometric X-ray Apparatus* is that it is perfectly effective in unskilled hands. This is due to the advent of the Coolidge x-ray tube, which has caused considerable modification in the design of the high-tension x-ray apparatus. The valve tube, interrupter, and every rotating piece of mechanism that is essential with the 'induction coil' type of apparatus can now be entirely eliminated from the modern high-tension outfit, resulting in a precision in radiography and radiotherapy that leaves little to be desired. This exactness in x-ray work is brought about by providing the radiologist with a means of controlling and measuring all the factors which control the radiogram, viz. : milliampères, voltage (penetration), time, distance between anode and plate.

The Medical Supply Association Ltd., 167–185, Gray's Inn Road, W.C.1, who produce this apparatus, which requires only one second's exposure for any part of the body, publish a descriptive pamphlet which they will send to any of our readers on application. The price of the complete apparatus is £195.

The Radiographic and Stereoscopic Screening Stand has been designed by Mr. F. J. Stansfield, and is supplied by Messrs. Reynolds & Branson Ltd., of Leeds.

This tube-stand possesses the usual horizontal and vertical movements, the tube-box and screen-holder moving as one unit. In addition, the tube-box can be disconnected from the plate-carrier and moved independently, thus enabling a stereoscopic radiograph of the chest and abdomen to be carried out. Further, a tilting movement of the tube-box enables the operator to use the central rays in every case. These movements can be carried out by means of graduated scales. The tube-box is made to take the Coolidge tube horizontally and is fitted with a rectangular diaphragm, which is adjustable by means of a Bowden wire control, operated from the front of the screen for adjustment of aperture as required. The framework carrying screen and plate-holder is hinged, and opens to admit the patient. A seat is provided which is adjustable in height for children. The plate-holder is interchangeable with the screen, and takes plates 15 × 12 inches and has carriers for smaller sizes.

Renal Compressor for X-ray Work.—This renal compressor, designed by Dr. A. E. Barclay, provides a simple, effective, and inexpensive addition to every modern x-ray equipment for radiography of the kidney region. Its method of working is shown in *Fig.* 142.

Some of its advantages are detailed as follows: (1) It can be attached to or placed on any type of x-ray couch; (2) It is easily adaptable to any part of the body; (3) It is independent of the tube-holder, and no movement due to respiration is imparted to the x-ray tube; (4) There is no complicated mechanism to get out of order; (5) It is portable and can be used on an ordinary bed at a patient's house; (6) The compression being by hand is more comfortable to the patient than when mechanical means are used.

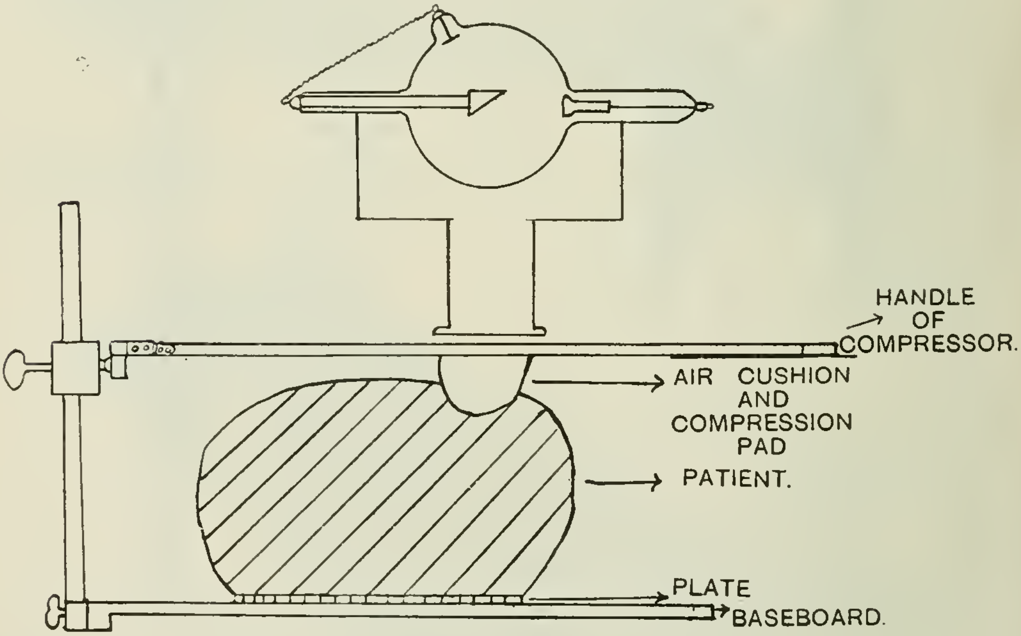


Fig. 142.

The price of the compression apparatus, in polished mahogany, with base-board, complete, is £5 5s., and the rectangular air cushion and compression pad 15s. Messrs. Mottershead & Co., 7, Exchange Street, Manchester, are the sole makers.

X-ray Tube-box with Standard and Couch.—This attachment (*Fig.* 143), designed by Mr. F. J. Stansfield, and supplied by Messrs. Reynolds & Branson Ltd., Leeds, is of special construction, being rigid and of easy adjustment. When not in use it is moved to one end of the couch and does not interfere with ordinary work. The tube-box has vertical movements by means of rack and pinion, with clamping device

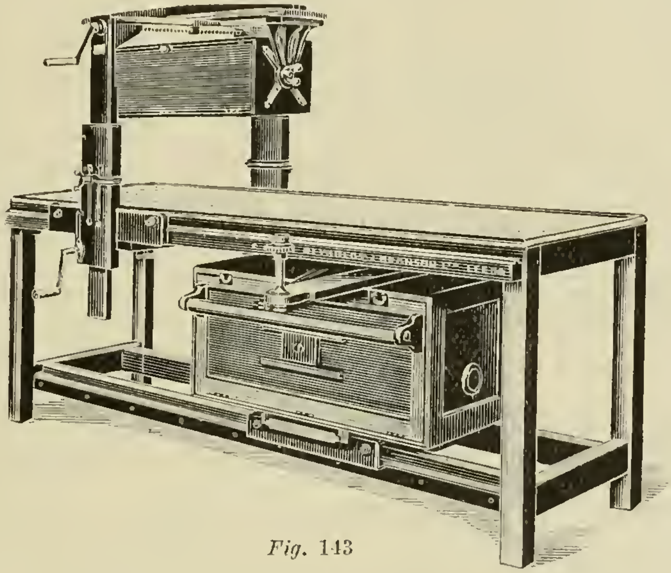


Fig. 143

and transverse screw movements in a horizontal plane; also tilting arrangement, both of which have graduated scales for stereoscopic work, and made to take a Coolidge tube.

BOOKS OF THE YEAR.

A List of the Principal Medical Works and New Editions Published during 1921.

⁂ *For the convenience of our readers any of the works in this list can be obtained through Messrs. John Wright and Sons Ltd., 'Medical Annual' Offices, Bristol.*

AMBULANCE AND NURSING.

Ambulance for Boy Scouts: How to Gain the Badge. By an Ambulance Instructor. Cr. 8vo, pp. 32. *J. Brown* *Net* 4*d*.

Applied Psychology for Nurses (Porter's). *Saunders* *Net* 8*s*.

Baby of To-day, The: First Principles in His Management. By Mrs. J. L. Hewer. 8vo, pp. 24. *Wright* *Net* 4*d*.

Bandages and Bandaging for Nurses (Cowan's). *Saunders* *Net* 10*s*. 6*d*.

Clinical Studies for Nurses (Aiken's). 4th ed. *Saunders* *Net* 16*s*.

Diseases of Children, for Nurses (McCombs'). 4th ed. *Saunders* *Net* 15*s*.

Handbook for Nurses. By J. K. Watson. Cr. 8vo, pp. 788. Illustrated. *Scientific Press* *Net* 10*s*. 6*d*.

Letters to a Nurse. By A Midland Doctor. Cr. 8vo, pp. 105. *Bale* *Net* 5*s*.

Materia Medica for Nurses (Pope's). *Saunders* *Net* 12*s*. 6*d*.

Medicine for Nurses. By J. Henderson. Cr. 8vo, pp. 270. *Arnold* *Net* 8*s*. 6*d*.

Model Answers to Questions on Nursing set by the Medico-Psychological Association. By H. MacPhail. Cr. 8vo, pp. 355. *Scientific Press* *Net* 6*s*.

Organization of Public Health Nursing. By A. M. Brainard. Cr. 8vo. *Macmillan* *Net* 8*s*. 6*d*.

Our Baby: For Mothers and Nurses. By Mrs. J. L. Hewer. 17th ed. Revised. Cr. 8vo, pp. 180. Illustrated. *Wright* *Net* 2*s*. 6*d*.

Psychology of Nursing, The. By A. C. Higgins. Cr. 8vo, pp. 357. *Putnam's* *Net* 15*s*.

Surgical and Gynæcological Nursing. By E. M. Parker and S. D. Breckinridge. 2nd ed. pp. 425. Illustrated. *Lippincott* *Net* 12*s*. 6*d*.

Surgical Ward Work and Nursing. A Handbook for Nurses and Others. By A. Miles. 8vo, pp. 426. *Scientific Press* *Net* 10*s*. 6*d*.

Text-book of Nursing Procedures. By A. C. Jamme. Cr. 8vo, pp. 140. *Macmillan* *Net* 7*s*. 6*d*.

Text-book of Surgical Nursing. By R. Colp and M. W. Keller. 8vo. Illustrated. *Macmillan* *Net* 16*s*.

ANATOMY, HISTOLOGY, MICROSCOPY, AND PHYSIOLOGY.

Anatomy of the Brain and Spinal Cord. By J. R. Whitaker. 5th ed. Cr. 8vo, pp. 256 and 103 Illus. *Livingstone* *Net* 12*s*. 6*d*.

Anatomy of the Human Orbit. By S. E. Whitnall. 8vo. *Oxford Med. Publications.* *Net* 35*s*.

Anatomy of the Nervous System. By S. W. Ranson. 8vo, pp. 395. Illustrated. *Saunders* *Net* 32*s*. 6*d*.

Autonomic Nervous System. By J. N. Langley. Part I. 8vo, pp. 80. *Heffer* *Net* 5*s*.

Collection of Lantern Slides demonstrating the Surgical Anatomy of the Temporal Bone; with an Album of 200 Photographs and Catalogue of Specimens and Guide. By A. H. Cheatle. *Lewis* Complete Outfit *Net* £30

Compend of Human Anatomy. By S. O. L. Potter. *Oxford. Med. Publications.* *Net* 9*s*.

Critical Microscopy. How to Get the Best out of the Microscope. By A. C. Coles. 8 Illus. *Churchill* *Net* 7*s*. 6*d*.

Fundamentals of Human Anatomy. By M. Pitzman. Roy. 8vo pp. 356. Illus. *Kimpton* *Net* 24*s*.

Guide to Anatomy. For Students of Medical Gymnastics, Massage, and Medical Electricity. By E. D. Ewart. Demy 8vo, pp. 301. *Lewis* *Net* 16*s*.

Hand Atlas of Anatomy. By Spalteholtz. New ed. 3 Vols. *Lippincott* *Net* 70*s*.

Human Embryology and Morphology. By Sir A. Keith. 4th ed., revised and enlarged. Roy. 8vo, pp. 500. Illustrated. *Arnold* *Net* 30*s*.

Human Physiology. By Prof. L. Luciani. With a Preface by J. N. Langley. 5 vols. Vol V, 8vo, pp. 430. *Macmillan* *Net* 30*s*.

Laboratory Manual of Anthropometry. By Harris H. Wilder. Roy. 8vo, pp. 204. Illustrated. *Pitman* *Net* 14*s*.

Manual of Physiology. By H. W. Lyle and D. de Souza. Cr. 8vo, pp. 838. *Oxford Med. Publications* *Net* 21*s*.

Manual of Practical Anatomy. By T. Walmsley. A Guide to the Dissection of the Human Body. In 3 Parts. Pt. 2, The Thorax and the Abdomen. 8vo, pp. 233. *Longmans* *Net* 10*s*. 6*d*.

Manual of Surgical Anatomy. By C. R. Whittaker. 3rd ed. Cr. 8vo, pp. 440, and 90 Illus., mostly coloured. *Livingstone* *Net* 15*s*.

Microbiology. Edited by C. E. Marshall. 3rd ed. 8vo. 200 Illus. *Churchill* *Net* 21*s*.

Microbiology and Micro-analysis of Foods. By A. Schneider. Roy. 8vo, pp. 272. Illustrated. *Pitman* *Net* 16*s*.

Microtomist's Vade Mecum (Lee's). Revised by J. B. Gatenby. 8th ed. *Churchill.* *Net* 28*s*.

Muscles of the Body: Their Uses and Development. 3rd. ed. Cr. 8vo. *Athletic Publications* *Net* 1*s*. 6*d*.

Physiology (Catechism Series). 4th ed. Part I. *Livingstone* *Net* 1*s*. 9*d*.

Surgical Anatomy. By W. F. Campbell. 3rd ed. 8vo, pp. 681. Illustrated. *Saunders* *Net* 30*s*.

Synopsis of Regional Anatomy. By T. B. Johnston. 11 Illus. *Churchill.* *Net* 12*s*. 6*d*.

BACTERIOLOGY.

Bacterial Diseases of Plants (Smith's). *Saunders* *Net* 50*s*.

Clinical Bacteriology and Hæmatology for Practitioners. By W. D'Este Emery. 6th ed. Demy 8vo. *Lewis* *Net* 15*s*.

Dairy Bacteriology (Orla-Jensen's). Translated from 2nd Danish ed. by P. S. Arup. Roy. 8vo. 70 Illus. *Churchill* *Net* 18*s*.

Manual of Bacteriology. By R. T. Hewlett. 7th ed. 31 Plates and 68 other Illus. *Churchill* *Net* 21*s*.

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Bristol Mental Hospital, Fishponds. Res. Med. Supt., J. Vincent Blachford, M.D. Clerk and Steward, Arthur Orme. Fishponds station, 1 mile.

Northwoods House, Winterbourne, 7 miles from Bristol. Res. Med. Prop., J. D. Thomas, B.A., M.B., B.C. Taxicab from Bristol, Fishponds, Winterbourne, or Patchway stations. *See also p.* **98**

Bromsgrove (Worcs.).— *Worcestershire Mental Hospital,* "*Barnsley Hall*". Res. Med. Supt., Dr. P. T. Hughes. Bromsgrove, M.R., 2½ miles. *See also p.* **102**

Burgess Hill (Sussex).—*St. George's Retreat.* Licensee, Miss Mary Doran. Med. Supt., Dr. F. W. Apthorp. Wivelsfield, 1½ miles; Burgess Hill station, 2 miles. *See also p.* **101**

Burley-in-Wharfedale (Yorks.).—*West Riding Asylum,* Scalebor Park. Res. Med. Supt., Dr. J. R. Gilmour. Burley-in-Wharfedale station, Mid. & N.E., ¼ mile.

Bury, (Lancs.).—*Oaklands,* Walmersley, (for ladies). Res. Med. Supt., Dr. Philip G. Mould.

Buxton.—*Wye House.* Res. Med. Supt., W. W. Horton, M.D. Buxton, L. & N. W.R. and M.R., 10 minutes. *See also p.* **102**

Caerleon (Mon.). — *Newport Borough Asylum.* Res. Med. Supt., W. F. Nelis, M.D. Caerleon, ¼ mile.

Cambridge.—*County Mental Hospital,* Fulbourn. Res. Med. Supt., Dr. M. A. Archdale. Cambridge station, 3 miles.

Canterbury.—*Stone House,* St. Martin's. Res. Med. Supt., Dr. E. F. Sall. Canterbury East.

Cardiff.—*Cardiff City Mental Hospital,* Whitchurch. Res. Med. Supt., E. Goodall, M.D. Llandaff, T.V.R., 1 mile.

Carlisle.—*Cumberland & Westmorland Mental Hospital.* Res. Med. Supt., W. F. Farquharson. M.D. Carlisle. 3 miles.

Carlow.—*District Asylum.* Res. Med. Supt., Dr. T. A. Greene. Carlow, ¼ mile.

Carmarthen.—*Joint Counties Mental Hospital.* Res. Med. Supt., J. Richards, F.R.C.S.E. Carmarthen, 2 miles.

Castlebar (Co. Mayo).—*Co. Mayo Mental Hospital.* Res. Med. Supt., F. C. Ellison, M.D. Castlebar, 1 mile.

Chartham (near Canterbury).—*Kent County Mental Hospital.* Res. Med. Supt., M. A. Collins, M.D. Chartham, 1 mile; Canterbury, 3 miles.

Cheadle (Cheshire). — *Cheadle Royal Mental Hospital.* Res. Med. Supt., J. Sutcliffe, L.R.C.P., M.R.C.S. Heald Green, 1 mile. *See also p.* **93**

Chester.—*Cheshire County Asylum.* Res. Med. Supt., G. Hamilton Grills, M.D. Chester station, 1½ miles.

Chichester.—*West Sussex Mental Hospital,* Graylingwell. Res. Med. Supt., Dr. H. A. Kidd. Chichester station, 1½ miles. *See also p.* **101**

Church Stretton. — *Stretton House,* Shropshire (for gentlemen). Med. Supt., Dr. A. A. Watson, C.M.G., D.S.O. Res. Med. Off., Dr. J. W. W. Adamson. Church Stretton station, ¼ mile. *See also p.* **95**

The Grove House, All Stretton, Shropshire (for ladies). Res. Prop. and Med. Supt., Dr. J. McClintock.

Clonmel.—*District Mental Hospital.* Res. Med. Supt., Dr. Bagenal C. Harvey. Clonmel, 1 mile.

Colchester.—*Essex and Colchester Mental Hospital,* Severalls. Res. Med. Supt., Dr. R. C. Turnbull. Colchester station, 1½ miles.

Cork.—*District Mental Hospital.* Res. Med. Supt., (*vacant*). Cork, 2 miles.

Lindville, Cork. Res. Med. Props., Dr. C. A. P. Osburne and Dr. J. C. Osburne.

Cupar (Fifeshire).—*Fife and Kinross District Asylum.* Res. Med. Supt., James H. Skeen, M.B. Springfield station, N.B.R., ¾ mile.

Darlington (Durham).—*Middleton Hall,* Middleton St. George. Res. Med. Supt., L. Harris-Liston, M.D. Dinsdale station, 1 mile.

Dartford (Kent).—*City of London Mental Hospital,* near Dartford. Res. Med. Supt., Dr. R. H. Steen. Dartford, S.E.R., 2 miles.

Denbigh (North Wales).—*North Wales Counties Asylum.* Med. Supt., Frank G. Jones, M.D. Denbigh, 1 mile.

Derby. — *Borough Mental Hospital,* Rowditch. Res. Med. Supt., Dr. John Bain. G.N.R. station, 1 mile; M.R., 2 miles. *See also p.* **96**

The County Asylum, Mickleover, Derby. Res. Med. Supt., M. L. Rowan, M.D. Derby, M.R., 5 miles; Mickleover, G.N.R., 2 miles.

Devizes.—*Wilts County Asylum.* Res. Med. Supt., S. J. Cole, M.D. Devizes, 1 mile.

Dorchester.—*Dorset Mental Hospital.* Res. Med. Supt., G. E. Peachell, M.D. Dorchester, 3 miles.

Downpatrick.—*Down District Asylum.* Res. Med. Supt., M. J. Nolan, L.R.C.P.I. and L. M. Downpatrick, 1 mile.

Dublin.—*Bloomfield,* Morehampton Rd. Med. Off., H. T. Bewley, M.D. Dublin, 1 mile.

Elm Lawn, Dundrum, Co. Dublin (ladies). Prop., Miss Bernard. Vis. Phys., Dr. A. S. Goff.

Farnham House and *Maryville,* Finglas, Dublin. Res. Med. Supt., H. P. D'Arcy Benson, M.D. Cab from Dublin, 2 miles.

Highfield (for ladies), Drumcondra; *Hampstead* (for gentlemen), Glasnevin. Res. Med. Supts., Hy. M. Eustace, B.A., M.D., and Wm. N. Eustace, L.R.C.P.I. & S.I. By rail, Dublin. *See also p.* **95**

House of St. John of God, Stillorgan, Dublin. Res. Phys., Dr. P. O'Connell. Stillorgan station, ½ mile.

Richmond District Asylum, Dublin. Res. Med. Supt., Dr. J. O'Conor Donelan ; also *Richmond District Asylum (Portrane Branch)*, Donabate, Dublin. Dep. Med. Supt., J. M. Redington, F.R.C.S.I. Donabate station, 1 mile.

St. Patrick's Hospital, James's Street, Dublin. Res. Med. Supt., Dr. R. R. Leeper. Branch Asylum, *St. Edmondsbury*, at Lucan. *See also p.* 88

St. Vincent's Asylum, Fairview, Dublin. Vis. Physicians, John Murphy, F.R.C.P.I., and F. X. Callaghan, F.R.C.P.I. Apply to the Superioress.

Stewart Institution, Palmerston, Chapelizod, Co. Dublin. Res. Med. Supt., F. E. Rainsford, M.D. Kingsbridge station, 2½ miles.

Verville, Clontarf, near Dublin. Prop., Dr. P. D. Sullivan.

Dudley (Stafford).—*Ashwood House*, Kingswinford. Props., Drs. Peacock and Pietersen. Res. Med. Supt., Dr. J. F. G. Pietersen. Stourbridge Junc., 3½ miles ; Dudley station, 4 miles ; Wolverhampton, 7 miles. Tel. : 19 Kingswinford. *See also p.* 98

Dumfries.—*Crichton Royal.* Res. Med. Supt., Dr. C. C. Easterbrook. Dumfries, 1 mile.

Dundee.—*Baldovan Institution* (for the treatment and education of the feeble-minded). Med. Supt., W. B. Drummond, F.R.C.P.E. Downfield, 1 mile ; Dundee, 4½ miles.

Dundee District Asylum, Westgreen, Dundee. Res. Med. Supt., W. Tuach-Mackenzie, M.D. Dundee, 3 miles ; Liff, 1½ miles.

Dundee Royal Asylum, *Gowrie House*, Dundee. Med. Off., A. B. Dalgetty, M.D. Sec., J. Wilkie, 20, Reform Street, Dundee.

Durham.—*County Asylum*, Winterton. Res. Med. Supt., Dr. H. G. Cribb. Sedgefield station, 2¾ miles, by bus.

Gateshead County Borough Mental Hospital, Stannington, Newcastle-on-Tyne. Res. Med. Supt., Lt.-Col. J. V. G. B. Tighe, M.B. Stannington N.E.R., 2½ miles.

Sunderland Borough Mental Hospital, Ryhope, Durham. Res. Med. Supt., J. Middlemass, M.D. Ryhope station, 1 mile.

Edinburgh.—*Edinburgh District Asylum*, Bangour Village, West Lothian. Res. Med. Supt., J. Keay, M.D. Uphall, N.B.Rly., 2 miles.

Midlothian and Peebles District Asylum. Res. Med. Supt., James H. C. Orr, M.D. Rosslynlee, 1 mile ; Edinburgh, 12 miles.

Royal Edinburgh Asylum, Morningside. Res. Phys. Supt., Professor George Robertson. Edinburgh, 1½ miles.

New Saughton Hall, Polton. Res. Med. Supt., S. R. Macphail, M.D., Edin. Polton station, 5 minutes ; Loanhead, 10 minutes' walk. *See also p.* 92

Elgin.— *Morayshire District Asylum.* Res. Supt., Miss Annie A. Kinloch. Vis. Med. Off., Dr. D. G. Campbell. Elgin, 1¼ miles.

Ennis.—*Clare Mental Hospital.* Res. Med. Supt., Dr. F. O'Mara. Ennis station, 2 miles.

Enniscorthy (Co. Wexford).—*District Lunatic Asylum.* Res. Med. Supt., Dr. H. T. J. Kennedy. Enniscorthy, 1 mile.

Epsom (Surrey).—*The Silver Birches*, Church Street (for ladies). Res. Licensee, Miss Daniel. Co-Licensee, Dr. E. G. C. Daniel. L. & S.W.R. and L.B. & S.C.R., 5 minutes. Tel. : 346 P.O. Epsom. *See also p.* 102

Exeter.—*City Mental Hospital*, Digbys, Heavitree. Res. Med. Supt., G. N. Bartlett, M.B., B.S. Exeter, 3 miles. *See also p.* 96

Court Hall, Kenton, near Exeter. Res. Licensees, Miss Mules, M.D., B.S., and Miss A. S. Mules, M.R.C.S. Starcross, 1 mile.

Devon Mental Hospital, Exminster. Res. Med. Supt., Dr. Arthur N. Davis. Exminster, 1¼ miles ; Exeter, 4 miles.

Wonford House Hospital for the Insane, Exeter. Res. Med. Supt., W. B. Morton, M.D. Exeter station (Queen St.) 1½ miles ; (St. David's), 2 miles.

Fairford (Gloucestershire).— *Fairford Retreat.* Res. Med. Supt. and Prop., Dr. A. C. King-Turner. Fairford, 1 mile.

Glasgow.—*District Mental Hospital*, Woodilee. Res. Med. Supt., H. Carre, L.R.C.P. & S. Lenzie station, 1 mile ; Glasgow, 8 miles.

Glasgow District Hospital for Mental Diseases, Gartloch. Res. Med. Supt., W. A. Parker, M.B. Garnkirk station, 1 mile.

Glasgow Royal Mental Hospital, Gartnavel. Res. Med. Supt., D. K. Henderson, M.D.

Govan District Asylum, Hawkhead, Glasgow. Res. Med. Supt., Dr. J. H. MacDonald. Crookston station.

Kirklands Mental Hospital, Bothwell, Glasgow. Res. Med. Supt., Wm. M. Buchanan, M.B. Bothwell and Fallside stations, ½ mile ; Glasgow, 9 miles.

Lanark District Asylum, Hartwood, Lanarkshire. Med. Supt., Dr. N. T. Kerr. Hartwood station, ¼ mile.

Smithston Asylum, Greenock. Res. Med. Supt., Wm. Leggett, M.D. Greenock West, 1½ miles ; Ravenscraig, ½ mile.

Gloucester. — *Barnwood House.* Res. Med. Supt., Arthur A. D. Townsend, M.D. Gloucester, 2 miles. *See also p.* 99

Gloucester County Mental Hospitals, Wotton and Barnwood, Gloucester. Res. Med. Supt., Dr. J. Marnan. Gloucester station, 1 mile.

Guernsey.—*St. Peter Port Asylum.* Med. Off., E. K. Corbin, M.R.C.S.

Haddington, N.B.—*East Lothian District Asylum.* Supt., Miss Jean Sinclair. Med. Off., H. H. Robarts, M.D. Haddington station, 10 minutes.

Hatton (near Warwick).—*County Asylum.* Res. Med. Supt., A. Miller, M.B. Also *Leigh House*, for private patients. Hatton, G.W.R. station, 2 miles; Warwick, 3 miles.

Haywards Heath.—*Brighton County Borough Mental Hospital.* Res. Med. Supt., C. Planck, M.A., M.R.C.S. Haywards Heath, 1½ miles.

Hellingly.—*East Sussex County Mental Hospital*, near Eastbourne. Res. Med. Supt., F. R. P. Taylor, M.D., B.S. Hellingly, 1 mile. *See also p.* 102

Henley-in-Arden (Warwickshire).—*Glendossill* (for both sexes). Res. Med. Prop., Dr. S. H. Agar. Henley-in-Arden, G.W.R., ¾ mile.

Hereford.—*Hereford County and City Mental Hospital.* Res. Med. Supt., J. G. Smith, M.D. Barrs Court, G.W., Mid., and L. & N.W.R., Hereford, 3 miles.

Huddersfield (near).—*West Riding Asylum*, "*Storthes Hall*," Kirkburton. Res. Med. Supt., T. S. Adair, M.D. Kirkburton, L. & N.W.R., 1 mile.

Hull.—*City Asylum.* Res. Med. Supt., J. Merson, M.D. Willerby station, 1 mile; Hull, 6 miles.

Inverness. — *District Asylum.* Res. Med. Supt., T. C. Mackenzie, M.D. Inverness, 2½ miles.

Ipswich.— *Borough Mental Hospital.* Res. Med. Supt., Dr. W. M. Ogilvie. Ipswich, 2 miles.

Isle of Man.—*Mental Hospital*, Union Mills, Douglas. Res. Med. Supt., F. C. Blakiston, M.R.C.S., L.R.C.P. Union Mills, ½ mile.

Isle of Wight.—*The County Asylum*, Whitecroft. Res. Med. Supt., W. J. A. Erskine, M.D. Blackwater, ¾ mile; or Newport, 2½ miles.

Isleworth (Middlesex).—*Wyke House.* Res. Prop., Dr. F. Murchison. Isleworth, Brentford, and Osterley station, 1 mile.

Ivybridge.—*Plymouth Mental Hospital.* Res. Med. Supt., Dr. Wm. Starkey. Bittaford, ¼ mile; Wrangaton, G.W.R., 1½ miles; Ivybridge, 3 miles.

Jersey.—*Cranbourne Hall*, Grouville. Med. Supt., A. C. Stamberg, O.B.E., M.B. Grouville, 2 minutes' walk.

Jersey Asylum. Res. Med. Supt., Julius Labey, M.R.C.S. Gorey Village, 1 mile.

Kilkenny.—*District Mental Hospital*, Kilkenny. Res. Med. Supt., Louis Buggy, L.R.C.P. Kilkenny station, ¼ mile.

Killarney.—*District Asylum.* Res. Med. Supt., E. W. Griffin, M.D. Killarney, ½ mile.

Knowle (near Fareham, Hants.).—*County Asylum.* Med. Supt., H. K. Abbott, M.D. Knowle platform, ⅛ mile.

Lancashire (near Newton-le-Willows).—*Haydock Lodge*, Private Mental Hospital. Res. Med. Prop., Dr. C. T. Street. Newton-le-Willows, 2 miles. *See also p.* 89

Lancaster.—*County Asylum.* Res. Med. Supt., D. M. Cassidy, M.D. Lancaster, L. & N.W. and Midland stations, each 1¼ miles.

Larbert (Stirlingshire).— *The Royal Scottish National Institution* (for education of imbecile children). Res. Med. Supt., Dr. R. D. Clarkson. Larbert station, 1 mile.

Leek (Stafford).—*County Mental Hospital*, Cheddleton. Med. Supt., W. F. Menzies, M.D. Wall Grange station, 1 mile.

Leicester.—*City Mental Hospital*, Humberstone. Res. Med. Supt., J. F. Dixon, M.D. Humberstone, ½ mile; Leicester, 2 miles.

Leicestershire and Rutland Asylum. Res. Med. Supt., R. C. Stewart, M.R.C.S. Narborough, ¾ mile; Leicester, 6 miles.

Letterkenny.—*Donegal District Asylum.* Res. Med. Supt., E. E. Moore, M.D. Letterkenny and Lough Swilly Rly., 1 mile.

Lichfield. — *County Mental Hospital*, Burntwood, near Lichfield. Res. Med. Supt., J. B. Spence, M.D. Lichfield City, 3½ miles; Hammerwich, 1½ miles.

Limerick.—*District Asylum.* Res. Med. Supt., Dr. P. J. Irwin. Limerick station, ½ mile.

Lincoln.—*District Asylum*, Bracebridge. Res. Med. Supt., Dr. T. L. Johnston. 2½ miles from Lincoln G.N.R. station.

The Lawn, Lincoln. Res. Med. Supt., Arthur P. Russell, M.B. Lincoln station, 1 mile. *See also p.* 93

Liverpool.—*Shaftesbury House*, Formby, near Liverpool and Southport. Res. Med. Supt., Stanley A. Gill, M.D., M.R.C.P. Formby, ¼ mile. *See also p.* 99

Tue Brook Villa, Liverpool, E. Res. Med. Supts., Drs. Tisdall and Moyes. Tue Brook station ¾ mile, or Green Lane car.

London.—*Bethlem Royal Hospital*, Lambeth Road, London, S.E. Phys. Supt., J. G. Porter Phillips, M.D., M.R.C.P. *See also p.* 87

Brooke House, Clapton, E. 5. Res. Med. Supt., Dr. Gerald Johnston. Clapton, G.E.R.

Camberwell House, 33, Peckham Road, S.E.5. Res. Med. Supt., F. H. Edwards, M.D., M.R.C.P. Asst. Med. Off., H. J. Norman, M.B., Ch.B., D.P.H. Tel.: "Psycholia, London." Telephone: New Cross 1057. *See also p.* **86**

Chiswick House, Chiswick. Res. Lic., C. M. Tuke, M.R.C.S. Chiswick station, ½ mile; Turnham Green station, 1 mile.

Clarence Lodge, Clapham Park, S.W. 4. Prop., Mrs. F. Thwaites. Med. Off., Dr. Percy Smith. Clapham Road, and Clapham Common (Electric), 15 minutes. Tel. No. 494 Brixton. *See also p.* **102**

Featherstone Hall, Southall (for ladies). Res. Med. Lic., W. H. Bailey, M.D. Southall station, 5 minutes.

Fenstanton, Christchurch Road, Streatham Hill. Res. Med. Supt., J. H. Earls, M.D. Streatham Hill, 5 minutes.

Flower House, Catford, S.E. 6. Res. Med. Supt., A. E. Price, M.D., M.S. S.E. & C. Rly., Beckenham Hill, 5 minutes.

Halliford House, Sunbury-on-Thames, S.W. Res. Med. Supt., W. J. H. Haslett, M.R.C.S. Sunbury station, 1¼ miles.

Hanwell Mental Hospital, Southall. Res. Med. Supt., A. W. Daniel, M.D.

Hayes Park, Hayes, Middlesex. Res. Med. Off., Dr. H. F. Stilwell. Hayes, 2 miles.

Hendon Grove Asylum (for ladies), Hendon, N.W. 4. Med. Lic., H. L. de Caux, L.M.S.S.A., L.S.A. (Lond.). By M.R., Hendon station, ½ mile.

London County Colony (for Insane Epileptics), Epsom. Res. Med. Supt. (*vacant*). L. & S.W. & L.B. & S.C.R., 1½ miles. (*Temporarily in use as a Ministry of Pensions Neurological Hospital.*)

London County Council, The Manor Certified Institution, Epsom. Res. Med. Supt., Dr. E. S. Litteljohn. L. & S.W. and L.B. & S.C.R.

London County Mental Hospital, Banstead Downs, near Sutton, Surrey. Res. Med. Supt., Dr. P. C. Spark. Belmont station, ½ mile; Sutton station, 1½ miles.

London County Mental Hospital, Bexley, Kent. Res. Med. Supt., G. Clarke, M.D. Bexley station, 1¼ miles.

London County Mental Hospital, Cane Hill, Coulsdon, Surrey. Res. Med. Supt., Lt.-Col. S. C. Elgee, O.B.E., L.R.C.P. & L.R.C.S. (I.). Coulsdon, S.E.R., or Coulsdon & Smitham Downs, 10 minutes.

London County Mental Hospital, Claybury, Woodford Bridge, Essex. Med. Supt., G. Foster Barham, M.D. Woodford Bridge station, G.E.R., 1½ miles. *See also p.* **101**

London County Mental Hospital, Colney Hatch, N. Res. Med. Supt., S. J. Gilfillan, O.B.E., M.A., M.B. New Southgate, G.N.R.

London County Mental Hospital, Horton, Epsom. Res. Med. Supt., Lt.-Col. J. R. Lord, C.B.E., M.B., C.M. L. & S.W. Ry., 1½ miles, L.B. & S.C.R., 1¾ miles.

London County Mental Hospital, Long Grove, Epsom. Res. Med. Supt., D. Ogilvy, M.D. L. & S.W.R. and L.B. & S.C.R.

Mead House, Hayes (for ladies). Med. Licensees, Dr. H. F. Stilwell and Dr. R. J. Stilwell.

Moorcroft House, Hillingdon, Uxbridge, 2 miles. Med. Licensees, Mr. J. F. Stilwell, Dr. R. J. Stilwell and Dr. G. W. B. James. West Drayton station, 2 miles.

Newlands House, Tooting Bec Common, S.W. 17. Private Mental Hospital for 12 ladies and 16 gentlemen. Phys. Supt., Dr. J. Noel Sergeant. Wandsworth Common, Balham and Streatham Hill stations, 1 mile. Motor bus Nos. 49, 49a, and 49b. *See also p.* **96**

Northumberland House, Green Lanes, N. Med. Supt., Bernard Hart, M.D. Finsbury Park station, 1 mile. *See also p.* **88**

Otto House, 47, North End Road, West Kensington (for ladies). Lic. Prop., Mrs. Sutherland. Lady Supt., Miss Brodie. West Kensington station, 1 mile; Barons Court station (Piccadilly Tube), 1 mile. *See also p.* **102**

Peckham House, 112, Peckham Road, S.E. Props., A. H. & H. G. Stocker. Res. Med. Supt., Dr. F. R. King. Peckham Rye station, 10 minutes' walk. *See also p.* **101**

Springfield Mental Hospital, Tooting, S.W. 17. Med. Supt., R. Worth, O.B.E., M.B., B.S. Wandsworth Common station, 1 mile.

St. Luke's Hospital for Mental Diseases (re-building). (Offices, 19, Nottingham Place, W.) *See also p.* **66**

The Priory, Roehampton, S.W., 15. Res. Med. Supt., James Chambers, M.D. Barnes station, 10 minutes.

West Ham Mental Hospital, Goodmayes, Ilford. Res. Med. Supt., Dr. John Custance Shaw. Goodmayes, 1 mile.

Wood End House, Hayes (ladies). Med. Lic., Dr. R. J. Stilwell and Dr. G. W. B. James. Hayes station, 1 mile; Uxbridge, 3 miles.

Londonderry.—*District Asylum.* Res. Med. Supt., John Watson, M.C., M.B., B.Ch. Londonderry, 1 mile.

Macclesfield.—*Cheshire County Mental Hospital*, Parkside. Res. Med. Supt., H. Dove Cormac, M.B., M.S. Macclesfield, 1 mile.

Maidstone.—*Kent County Mental Hospital.* Res. Med. Supt., H. Wolseley-Lewis, F.R.C.S., M.D. Maidstone, 1½ miles.

Malling Place, West Malling, Kent. Res. Med. Supt., Dr. G. H. Adam. Malling station, 1 mile.

Market Lavington (Wilts.).—*Fiddington House.* Res. Med. Supt., J. R. Benson, F.R.C.S., F.R.C.P. Lavington, G.W.R., 1 mile; Devizes, 6 miles. *See also p.* 100

Maryborough (Queen's County).—*District Asylum.* Res. Med. Supt., Dr. P. Coffey. Maryborough, ½ mile.

Melrose, N.B.—*Roxburgh, Berwick, and Selkirk District Asylum.* Res. Med. Supt., Patrick Steele, M.D. Melrose, 1 mile.

Melton (Suffolk.).—*St. Audry's Hospital for Mental Diseases.* Res. Med. Supt., J. R. Whitwell, M.B. Melton station, 1¼ miles; Woodbridge station, 2¼ miles.

Menston (near Leeds).—*West Riding Asylum.* Res. Med. Supt., S. Edgerley, M.D. Guiseley, 1 mile.

Merstham (Surrey).—*County Mental Hospital,* Netherne, near Coulsdon. Med. Supt., Dr. P. C. Coombes. Coulsdon station, 2 miles.

Middlesbro' (Yorks).—*Mental Hospital.* Res. Med. Supt., Dr. J. W. Geddes. Middlesbro', 2 miles.

Monaghan (Ireland).—*District Asylum.* Res. Med. Supt., Dr. T. P. Conlon. Monaghan, ¼ mile.

Montrose, N.B.— *The Royal Asylum.* Res. Med. Supt., C. J. Shaw, M.D. Hillside, ¼ mile; Dubton, 1 mile.

Morpeth.—*Northumberland County Asylum.* Res. Med. Supt., Guy R. East, M.D., D.P.H. Morpeth station, 1 mile.

Mullingar.—*District Asylum.* Res. Med. Supt., Dr. Laurence Gavin. Mullingar station, 1 mile.

Newcastle-on-Tyne.—*City Mental Hospital,* Gosforth. Res. Med. Supt., H. D. MacPhail, M.D. Newcastle, 4 miles.

Northampton.—*Berrywood Mental Hospital.* Res. Med. Supt., Dr. F. J. Stuart. Castle station, 2½ miles; Midland station, 3 miles.

St. Andrew's Hospital, Northampton. Med. Supt., D. F. Rambaut, M.A., M.D. Northampton station, 1 mile. *See also p.* 91

Norwich.—*Bethel Hospital for Mental Diseases.* Res. Med. Supt., S. J. Fielding, M.B. Cons. Phys., Saml. J. Barton, M.D. Norwich (Thorpe) station, 1 mile.

City of Norwich Mental Hospital, Hellesdon, near Norwich. Res. Phys. and Supt., Dr. David Rice. Hellesdon, 1 mile.

Heigham Hall, Norwich. Res. Med. Prop., J. G. Gordon-Munn, M.D. Thorpe station, 1½ miles.

Norfolk County Mental Hospital, Thorpe, Norwich. Res. Med. Supt., D. G. Thomson, C.B.E., M.D. Whitlingham, 1 mile; Norwich, 2½ miles.

The Grove, Old Catton, near Norwich (for ladies). Res. Med. Supt., C. A. P. Osburne, F.R.C.S. Apply to the Misses McLintock,

Nottingham.—*City Asylum,* Mapperley Hill. Med. Supt., G. L. Brunton, M.D.

Notts County Mental Hospital, Nottingham. Res. Med. Supt., S. L. Jones, M.R.C.S. Radcliffe-on-Trent, 2 miles.

The Coppice. Res. Med. Supt., David Hunter, M.B. (Camb.). Midland station, 2½ miles; Gt. Northern & Gt. Central station, 1½ miles. *See also p.* 92

Omagh.—*District Asylum.* Res. Med. Supt., Dr. John Patrick. Omagh station, 2 miles.

Oxford.—*County and City Mental Hospital,* Littlemore. Res. Med. Supt., T. S. Good, O.B.E., M.R.C.S. Littlemore station.

The Warneford, Oxford, 1½ miles. Res. Med. Supt., Alex. W. Neill, M.D. Oxford station, 2¼ miles. *See also p.* 93

Paisley.—*Craw Road Asylum.* Vis. Med. Off., H. C. Donald, F.R.C.S. Res. Med. Off., Miss Margaret L. Johnston, M.B. Paisley, 1 mile.

Paisley District Asylum, Riccartsbar. Med. Off., Dr. Mary R. Knight. Paisley West, ¼ mile.

Renfrew District Asylum, Dykebar, Paisley. Res. Med. Supt., R. D. Hotchkis, M.D. Paisley, 2¼ miles.

Perth.—*District Asylum,* Murthly. Res. Med. Supt., Lewis C. Bruce, M.C., M.D. Murthly station adjoins the Asylum.

James Murray's Royal Asylum, Perth (for patients of the middle and upper classes). Phys. Supt., W. D. Chambers, M.A., M.D. (Edin). Perth station, under 2 miles.

Plympton.—*Plympton House,* Plympton, South Devon. Res. Props., Dr. Alfred Turner and Dr. J. C. Nixon. Plympton, 1 mile; Marsh Mills, 2 miles; Plymouth, 5 miles. *See also p.* 99

Portsmouth.—*Borough Mental Hospital.* Res. Med. Supt., H. Devine, O.B.E., M.D. (Lond.). Clerk and Steward, John C. Kersey. Fratton, 1½ miles. *See also p.* 95

Prestwich (near Manchester).—*County Asylum.* Res. Med. Supt., Dr. F. Perceval. Prestwich, ¾ mile.

Rainhill (nr. Liverpool).—*County Asylum.* Res. Med. Supt., T. P. Cowen, M.D. St. Helens, 2½ miles; Rainhill, 1 mile.

Rotherham (Yorkshire).—*The Grange,* 5 miles from Sheffield (for ladies). Con. Phys., W. C. Clapham, M.D. Res. Phys., G. E. Mould, M.R.C.S., L.R.C.P. Grange Lane station, G.C.R., ½ mile. *See also p.* 96

St. Albans.—*Herts County Mental Hospital,* Hill End. Med. Supt., A. N. Boycott, M.D. Hill End station, G.N.R., 3 minutes.

Napsbury Mental Hospital (under the Middlesex County Council), near St. Albans, Herts. Res. Med. Supt., L. W. Rolleston, M.B., B.S. Napsbury, M.R., 5 minutes' walk.

St. Leonards-on-Sea.—*Ashbrook Hall*, Hollington (for ladies). Res. Lics., Mr. and Mrs. Charles E. H. Somerset. Warrior Square station, 2 miles.

Salisbury.— *Fisherton House Mental Hospital.* Med. Supt., J. Kennedy Will, M.D. Salisbury station, L. & S.W. and G.W., 5 minutes.

Laverstock House, Salisbury. Res. Med. Supt., J. R. Benson, F.R.C.S., F.R.C.P. Salisbury, 1½ miles. *See also p.* **97**

Shrewsbury.—*Shropshire County Asylum*, Bicton Heath. Res. Med. Supt., W. S. Hughes, M.B., B.S. Shrewsbury station, 2½ miles.

Sleaford.—*Kesteven County Asylum.* Med. Supt., J. A. Ewan, M.A., M.D. Rauceby, G.N.R., ¼ mile.

Sligo.—*District Asylum.* Res. Med. Supt., Dr. Joseph Petit. Sligo, 1½ miles.

Stafford.—*County Mental Hospital.* Res. Med. Supt., B. H. Shaw, M.D. Stafford, 1 mile.

Coton Hill Mental Hospital, Stafford. Res. Med. Supt., R. W. Hewson, L.R.C.S. & P. (Edin.). Stafford, 1 mile.

Stirling.—*District Asylum*, Larbert. Med. Supt., Dr. R. B. Campbell. Larbert, 1½ miles.

Stone (near Aylesbury).—*Bucks Mental Hospital.* Res. Med. Supt., H. Kerr, M.D. Aylesbury station, 3¼ miles. *See also p.* **98**

Talgarth.—*Brecon and Radnor Asylum.* Res. Med. Supt., R. Pugh, M.D.

Tamworth (Staffs.).—*The Moat House* (for ladies). Res. Licensees, Edward Hollins, M.A., and Mrs. S. A. Michaux. Tamworth station, ¾ mile.

Taunton.—*Somerset & Bath Asylum*, Cotford, near Taunton. Res. Med. Supt., Dr. H. T. S. Aveline. Norton Fitzwarren station, 2 miles.

Ticehurst (Sussex).—*Ticehurst House.* Res. Med. Supt., C. F. F. McDowall, M.D. Wadhurst, 4 miles, or Ticehurst Road, 3 miles.

Tonbridge.—*Redlands.* Phys. Supt., Dr. J. Noel Sergeant. Tonbridge junction, 2½ miles.

Virginia Water. — *Holloway Sanatorium*, Hospital for the Insane, St. Ann's Heath. Res. Med. Supt., W. D. Moore, M.D. Asst. Med. Offs., T. E. Harper, L.R.C.P., C. Rutherford, M.B., Elizabeth Casson, M.B. and (one vacancy). Virginia Water station, 5 minutes. Seaside Branch, *St. Ann's*, Canford Cliffs, Bournemouth. Med. Off., C. E. C. Williams, M.D. *See also p.* **90**

Wadsley (near Sheffield).—*South Yorkshire Asylum.* Res. Med. Supt., W. J. N. Vincent, C.B.E., M.D. Wadsley Bridge, 1 mile ; Sheffield, 4 miles.

Wakefield.—*West Riding Asylum.* Res. Med. Supt., Prof. J. Shaw Bolton, M.D. Kirkgate and Westgate station, 1 mile.

Wallingford (Berks.).—*Berkshire Mental Hospital.* Res. Med. Supt., Dr. Walter Woolfe Read. Cholsey, 1 mile.

Warlingham (Surrey).—*Croydon Mental Hospital.* Res. Med. Supt., E. S. Pasmore, M.D. Upper Warlingham, 3¼ miles.

Warrington (Lancs.). —*Lancashire County Asylum*, Winwick. Res. Med. Supt., A. Simpson, C.B.E., M.D. Warrington, 2½ miles.

Waterford.—*Carriglea*, Dungarvon, Co. Waterford. Conducted by the Order of Bon Sauveur. Vis. Phys., Dr. J. W. Williams.

District Mental Hospital, Waterford. Res. Med. Supt., Dr. Alexis FitzGerald. G.S. & W.R., North station, 2 miles.

St. Patrick's Institution, Belmont Park, Waterford. Conducted by the Brothers of Charity. Vis. Phys., Dr. P. Coghlan. Waterford station, 1 mile.

Wells.—*Somerset and Bath Asylum*, Wells, Som. Res. Med. Supt., Dr. J. E. P. Shera. Wells station, 1½ miles.

Whitchurch (Salop).—*St. Mary's House.* (For ladies only.) Res. Med. Supt., C. H. Gwynn, M.D. Whitchurch, 1 mile.

Whittingham (near Preston).—*County Asylum.* Res. Med. Supt., Dr. R. M. Clark. Whittingham station, 3 mins.

Winchelsea (Sussex).—*Periteau*, near Hastings (for ladies). Physician, Harvey Baird, M.D. Winchelsea station, 1 mile.

Woking (Surrey).—*County Mental Hospital*, Brookwood. Res. Med. Supt., J. A. Lowry, M.D. Brookwood station, 1¼ miles.

Worcester.—*County & City Menta Hospital*, Powick. Res. Med. Supt., Dr. H. F. Fenton. Worcester station, 4 miles.

York.—*Bootham Park Registered Hospital*, York. Res. Med. Supt., G. R. Jeffrey, M.D. York station, 1 mile. *See also p.* **86**

The Pleasaunce, York (ladies only). Phys. Supt. and Res. Licensee, L. D. H. Baugh, M.B. York, 1½ miles. *See also p.* **94**

The Retreat, York. Res. Med. Supt., Bedford Pierce, M.D., F.R.C.P. (Lond.). York station, 1½ miles. *See also p.* **100**

North Riding of Yorkshire Asylum, Clifton, York. Res. Med. Supt., Dr. A. I. Eades. York, 2 miles.

York City Asylum, Fulford, York. Res. Med. Supt., Dr. C. L. Hopkins. Naburn, N.E.R., ½ mile.

MENTAL DEFICIENCY ACT, 1913: CERTIFIED INSTITUTIONS AND HOUSES.

Class A.—Certified Institutions. *Class B.*—Institutions approved under Section 37.
Class C.—Certified Houses. *Class D.*—Approved Homes.

BERKSHIRE.

Cumnor Rise, Oxford. — 33 females. High-grade feeble-minded. Managers, Committee. Hon. Secretary, Honble P. Bruce, 4, Wellington Place, St. Giles, Oxford. (*Class A.*)

BUCKINGHAMSHIRE.

Winslow Union Workhouse, Winslow.—20 male, 20 female, adults. Feeble minded and imbecile. Managers, Winslow Board of Guardians. (*Class B.*)

CHESHIRE.

Sandlebridge, near Alderley Edge.—295 males and females. Life care is provided, but only educable mentally defective children under 13 years of age are eligible for admission. Managers, Incorporated Lancashire and Cheshire Society for the Permanent Care of the Feeble Minded. Sec., E. M. Richards, 1, Brazenose Street, Manchester. (*Class A.*)

Ashton House, 26, Village Road, Oxton, Birkenhead. For girls only. Supt., Miss Daine. (*Class C.*)

CORNWALL.

The Elizabeth-Barclay Home, Bodmin.—26 females. Matron, Miss E. Hunt; Hon. Sec., Miss M. I. Braddon, Skisdon, Wadebridge. (*Class D.*)

CUMBERLAND.

Durran Hill House, Carlisle. — 65 females. Feeble minded. Higher Grade. Supt., Sister E. Ring. (*Class A.*)

DERBYSHIRE.

Hopwell Hall, Ockbrook.—50 males. Sec., Mrs. Kipling, 40, Magdala Road, Nottingham. (*Class A.*)

Whittington Hall, Whittington, near Chesterfield. — 400 females. Managers, The Incorporation of National Institutions for Persons requiring Care and Control, 14, Howick Place, Victoria Street, S.W. 1. (*Class A.*)

DEVON.

Western Counties Institution, Starcross.—450 males and females (trainable children). Sec. Supt., E. W. Locke. (*Class A.*)

DORSET.

Kingsgate, West Moors, Wimborne.—10 females. Supt., Miss Mason. (*Class D.*)

DURHAM.

Monkton Hall Home for Lads, Jarrow-on-Tyne.—48 males. Sec., J. Stewart, 90, Pilgrim Street, Newcastle. (*Class A.*)

ESSEX.

Bigods Hall, R. C. Special School, near Dunmow.—61 males. Corresponding Manager, Rt. Rev. Mgr. Wm. O'Grady, St. George's, Walthamstow, E. 17. (*Class A.*)

Etloe House, Church Road, Leyton.—102 high-grade feeble-minded females, over 16. Managers, The Sisters of the Sacred Hearts of Jesus and Mary, Church Road, Leyton. (*Class A.*)

The Institution, Tendring, Essex.—26 males, 26 females. Managers, Guardians of the Tendring Union. Supt., H. J. Burden. (*Class A.*)

Royal Eastern Counties Institution, Colchester.—730 males and females, all grades. Managers, The Board of Directors. Address communications to the Medical Superintendent. (*Class A.*)

The Co-operative Sanatorium, Billericay.—56 males of the middle class. Managers, The Co-operative Sanatoria, Ltd. (*Class A.*) *See also p.* 72

Gay Bowers, West Hanningfield, Chelmsford.—7 males. Manager, Percy Chennells. (*Class D.*)

FLINTSHIRE.

Walmer School for the Blind and Blind Deaf, Rhyl.—13 males and females. Feeble-minded. Supt., Miss Roberts. (*Class D.*)

GLOUCESTERSHIRE.

Brentry Certified Institution, Westbury-on-Trym, Bristol.—230 males. Res. Supt., T. R. Lambert; Med. Off., Dr. Ormerod. Clifton Down, Redland, or Patchway stations, 3½ miles. (*Class A.*)

Poor Law Institution, Stapleton.—16 males, 26 females. Managers, Bristol Board of Guardians. Superintendent, L. W. Williams. (*Class A, B, C,* and *D.*)

St. Mary's Home, Painswick, near Stroud.—26 females. High-grade feeble-minded. Apply, Lady Supt. (*Class A.*)

Stoke Park Colony, Hanham Hall, Hanham, near Bristol.—240 males. Managers, The Incorporation of National Institutions for Persons requiring Care and Control. (*Class A.*)

Stoke Park Colony, Royal Victoria Home, Horfield. — 42 females. Managers, The Incorporation of National Institutions for Persons requiring Care and Control. (*Class A.*)

Stoke Park Colony, Stapleton, Bristol.—750 patients of both sexes (not exceeding 650 females or 300 males). Managers, The Incorporation of National Institutions for Persons requiring Care and Control. (*Class A.*) *See also p.* 70

Stoke Park Colony, West Side, Stapleton.—178 males. Managers, The Incorporation of National Institutions for Persons requiring Care and Control. (*Class A.*)

Royal Fort Home, Bristol.—15 females, high grade mentally deficient. Managers, Ladies' Committee. Hon. Sec., Miss Savill, 40, Tyndall's Park Road. (*Class D.*)

HAMPSHIRE.

St. Mary's Home, Alton.—45 mentally and morally deficient females. Managers, The Wantage Community of Sisters. (*Class A.*)

Poor Law Institution, Parkhurst, Isle of Wight.—7 males, 4 females. Supt., J. Mckeown. Managers, Isle of Wight Board of Guardians. (*Class B.*)

HERTS.

Hillside Special School for Mentally Defective Boys, Buntingford.—43 males. Secretary, T. W. Hunter, Archbishop's House, Westminster, S.W. 1. (*Class A.*)

St. Elizabeth's Home for Epileptics, Much Hadham.—136 males and females. Apply to T. W. Hunter, Archbishop's House, Westminster, S.W. 1. (*Class A.*)

Rowley Lodge, Rowley Green, Barnet.—12 boys and girls. Supts., The Misses Wall and Binney. (*Class C and D.*)

KENT.

Princess Christian's Farm Colony, Hildenborough. — 73 males, 68 females. Managers, National Association for the Feeble Minded. Superintendent, Miss Pitman. (*Class A* and *D.*)

LANCASHIRE.

Allerton Priory R.C. Special Industrial School, Woolton, Liverpool.—106 male and female educable children. Superintendent, Sister E. Thompson. (*Class A.*)

Brockhall, Whalley, near Blackburn.—308 females. Feeble minded, imbeciles, and moral imbeciles. Managers, Mental Deficiency Acts Committee, Lancashire Asylums Board, Preston. (*Class A.*)

Pontville R.C. Special School, Ormskirk.—106 boys. Mentally defective. Managers, Sisters of the Sacred Hearts of Jesus and Mary. Correspondent, Right Rev. Monsignor Canon Pinnington, 109, Great Mersey Street, Liverpool. (*Class A.*)

Royal Albert Institution, Lancaster.—461 males, 289 females. Managers, The Central Committee of the Royal Albert Institution, Lancaster. Secretary, Samuel Keir. (*Class A.*) *See also p.* 72

Seafield House, Waterloo Road, Seaforth, near Liverpool.—240 feeble minded children. Managers, Guardians of the West Derby Union, Liverpool. (*Class B.*)

Linthal, Freshfield, Liverpool.—Males only. Manager, Miss Bowyer. (*Class C.*)

LEICESTERSHIRE.

Cross Corners, Loughborough Road, Leicester.—32 females. Feeble minded. Managers, Leicester Corporation Mental Deficiency Committee. Clerk, C. F. Smith, Alliance Chambers, Horsefair Street, Leicester. (*Class A.*)

LONDON.

39, *Downs Road*, 41, *Downs Road*, 46–48, *Pembury Road, Clapton, E.* 5.—80 females. Apply: Secretary, Girls' Training Homes, Clapton. (*Class A.*)

Springfield Lodge, Grove Hill Road. Denmark Hill, S.E, 5.—28 females. Supt., Miss A. Davies. (*Class A.*)

The Helping Hand Home, 16, *Cathcart Hill, N.*—30 females. High grade mentally deficients. Managers, Committee; Hon. Sec., Mrs. Geoffrey Russell, 17, Church Row, Hampstead, N.W. 3. (*Class A.*)

Kensington Guardians' Institution, Marloes Road, W. 8.—60 females. Managers, Guardians of the Poor of the Parish of St. Mary Abbots, Kensington. Supt., Mr. Francis Birch. (*Class B.*)

Woolwich Workhouse, Plumstead, S.E.—25 males, 45 females sent by L.C.C. only. Managers, Board of Guardians of the Woolwich Union. E. G. Manning, Supt. (*Class B.*)

MIDDLESEX.

All Souls' Special School, Pield Heath House, Hillingdon. — 89 females. Educable and imbeciles. Manager, T. W. Hunter, Archbishop's House, Westminster, S.W. 1. (*Class A.*)

Bramley House, Clay Hill, Enfield.—45 females. Supt., Miss A. Gardner. (*Class A.*)

Crathorne, Oak Lane, East Finchley, N.—32, consisting of women with their infants. Hon. Sec., Miss Pierce, 57, Bryanston Street, W. 1. (*Class A.*)

Enfield House, 19, *Chase Side Crescent, Enfield, Middlesex.*—40 males. Managers, Guardians of Edmonton Union. Superintendent, E. B. Willett. (*Class A.*)

Warkworth House, Isleworth.—38 boys. Managers, Middlesex County Council. Supt., S. F. Rowbotham. (*Class B.*)

Arniston, 44, The Grove, Isleworth.—10 males under 14, 10 females. Managers, Misses J. M. and M. D. Isbister. (*Class C.*)

Normansfield, Hampton Wick. — 140 males and females. Manager, Dr. R. L. Langdon-Down. (*Class C.*) *See also p.* 72

The Gables, Upper Teddington Road, Hampton Wick.—18 male and female children. Manager, Miss Frances M. Deck. (*Class C.*)

Alexander House, 117, High Street, Uxbridge.—24 females over 16. Managers, Committee. Supt., Miss E. Collyer. (*Class D.*)

Conifers, Hampton Wick.—16 females, and 3 male children. Manager, Dr. R. L. Langdon-Down. (*Class D.*)

Trematon, Hampton Wick.—24 males. Manager, Dr. R. L. Langdon-Down. (*Class D.*)

NORFOLK.

The Lodge, Bowthorpe Road, Norwich.—6 males, 20 females. Managers, The Guardians of the Poor of the Norwich Incorporation. (*Class B.*)

The Otleys, Seething, Norwich.—30 females, children and girls. Superintendent and Proprietress, Miss S. A. Huntly. (*Class D.*)

NORTHUMBERLAND.

Prudhoe Hall Colony, Prudhoe.—185, all classes. Managers, Northern Counties Joint Poor Law Committee. Clerk, J. W. Coulson, Poor Law Offices, South Shields. (*Class A and B.*)

Home of Industry, Bow Villa, Morpeth.—16 females. Feeble minded. Superintendent, Miss A. Pawsey. (*Class D.*)

SOMERSET.

Stoke Park Colony, Leigh Court, Abbot's Leigh, nr. Bristol.—260 females. Managers, The Incorporation of National Institutions for Persons requiring Care and Control. (*Class A.*)

Rock Hall House, Combe Down, Bath.—18 males, 19 females. Supt., Miss J. Quinton. (*Class A.*)

Long Ashton Poor Law Institution, Flax Bourton, near Bristol. — 32 males, 34 females. Managers, Guardians of the Long Ashton Union. (*Class B.*)

STAFFORDSHIRE.

Burton-on-Trent Poor Law Institution.—3 males, 2 females. Managers, Guardians Burton Union. Master, R. Bareham. (*Class A.*)

New Cross Poor Law Institution, Mental Wards, Wolverhampton.—1 male. Managers, Wolverhampton Board of Guardians. Supt., T. D. Rollinson. (*Class A.*)

Poor Law Institution, Dudley, Stafford.—50 males, 50 females. Managers, Guardians of the Dudley Union. (*Class A.*)

SUFFOLK.

Handford Home, Ranelagh Road, Ipswich.—20 females. Supt., Mrs. A. Turner. (*Class A.*)

St. Joseph's Home, The Croft, Sudbury.—14 females. Superintendent, Miss Murray. (*Class A.*)

SURREY.

Royal Earlswood Institution, Redhill.—550. Med. Supt., Dr. C. Caldecott. Secretary, 14, Ludgate Hill, E.C. 4. (*Class A.*)

SUSSEX.

Avonhurst, Burgess Hill.—20 private cases only, males and females under 16. Manager, Miss S. M. Macdowall. (*Class C.*)

WARWICK.

Agatha Stacey Homes, Rednal, near Birmingham.—40 females; and *Enniskerry, Knowle, Warwickshire.*—24 females. Managers, The Central Committee, 158, Broad Street, Birmingham. (*Class A.*)

Midland Counties Institution, Knowle, near Birmingham.—101 males, 31 females. Managers, The Committee. Superintendent, A. H. Williams. Medical Officer, J. O. Hollick, M.B. (*Class A.*)

WILTS.

Devizes Poor Law Institution. — 16 females between the ages of 20 and 50 years. Managers, Devizes Board of Guardians. (*Class B.*)

Pewsey Poor Law Institution, Pewsey.—12 females. Managers, Pewsey Board of Guardians. Supt., H. England. (*Class B.*)

Poor Law Institution, Semington, near Trowbridge.—6 males, 30 females. Managers, Guardians Trowbridge and Melksham Union. Supt., C. H. Taylor. (*Class B.*)

WORCESTERSHIRE.

Besford Court Home, near Defford.—For educable mentally defective children from 7 to 16 years. Supt., The Right Rev. Monsignor T. A. Newsome. (*Class A.*)

Evesham Poor Law Institution.—Certified only for dealing with cases arising in the Evesham Union Area. Superintendent, J. H. Damen. (*Class B.*)

YORKSHIRE.

Mid-Yorkshire Institution, Whixley, York.—130 males. Managers, The Mid-Yorkshire Joint Board. Supt., Capt. J. Brown, I.S.O. (*Class A.*)

The Grange, Altofts, Normanton.—15 females, good class. Mentally deficient, epileptics. Manager, Mrs. E. A. Howard. (*Class C.*)

INSTITUTIONS AND HOMES FOR INEBRIATES.

LICENSED UNDER THE ACTS, 1879–1900.

The patient must sign a Form expressing a wish to enter the Home, before a magistrate. This can be done at the private residence of the patient, or at the retreat, if previous notice has been given. Two friends must also sign a declaration that they consider the patient an 'Inebriate' within the meaning of the Acts.

* NOTE:—Ashford is a Roman Catholic Religious Institution.

MALES ONLY.

Folkestone.—*Capel Lodge*, near Folkestone. Res. Prop., E. Norton, M.D. Folkestone Junction, 2 miles.

Rickmansworth (Herts). — *Dalrymple House*. Apply to Res. Med. Supt., Dr. F. S. D. Hogg. Rickmansworth station, Gt. Central & Metropolitan Rlwy, ½ mile; L. & N.W.R., 1 mile. *See also p.* 77

FEMALES ONLY.

Ashford (Middlesex).* — *Ecclesfield*. Med. Supt., Dr. M. F. Cock. Apply, Mother Superior. Ashford station, 1 mile. *See also p.* 77

Belfast.—*The Lodge Retreat*, Irwin Avenue, Strandtown. Med. Attendant, R. W. Leslie, M.D. Knock line train, 2 minutes' walk.

Beverley (E. Yorks).—*Albion House*. Hon. Sec., Mrs. T. R. Pentith, The Limes, Sutton-on-Hull.

Leicester.—*Melbourne House*. Principal, Mr. H. M. Riley. Med. Attendant, R. Sevestre, M.A., M.D. Camb. Station, 2 miles.

Newmains (N.B.).—*Newmains Retreat* for ladies. Hartwood station, Cal. Railway, 2 miles.

Spelthorne St. Mary (Bedfont, Middlesex).—Apply to the Sister Superior C.S.M.V. Med. Supt., Dr. H. W. Newton. Feltham, S.W.R., 1 mile.

Torquay.—*Temple Lodge* (C.E.T.S. *Institution*). Res. Supt., Sister in Charge. Med. Off., W. Odell, F.R.C.S. *See also p.* 77

UNLICENSED HOMES.

Beckenham (Kent). — *Norwood Sanatorium*, The Mansion, Beckenham Park. Med. Supt., F. Hare, M.D. Beckenham Junction station, 10 minutes. *See also p.* 78

Lasswade, Midlothian.—*Craufurd Bank*. Temperance Home for Women. Hon. Sec., Miss Cook, 27, Regent Terrace, Edinburgh.

Tiree, Island of (West Highlands of Scotland).—Farmhouse boarding facilities. Oban station, 7 hours' sail. Med. Supt., Dr. Thomas Stewart. Apply, James B. Thomson, 2, Eden Terrace, Morningside, Edinburgh. *See also p.* 78

SANATORIA FOR CONSUMPTION AND OTHER FORMS OF TUBERCULOSIS.

Aberchalder (N.B.). — *Inverness-shire Sanatorium*. Med. Supt., D. S. Johnston, M.D. Aberchalder, 2 miles.

Ashford (Kent).—*Grosvenor Sanatorium*, Kennington, near Ashford. Res. Med. Supt., J. A. Milne, M.B., Ch.B.

Aysgarth, S.O. (Yorks).—*Wensleydale Sanatorium*. Physicians, D. Dunbar, M.B., B.S., and W. N. Pickles, M.D., B.S. Aysgarth, ½ mile, via Northallerton, N.E.R. and Hawes Junction, M.R. *See also p.* 74

Baguley (Cheshire). — *Baguley Sanatorium*. For Manchester cases. Med. Supt., R. C. Hutchinson, M.D.

Banchory (Scotland). — *Nordrach-on-Dee*. Senr. Phys., Ian S. Stewart, M.D. Banchory, 1½ miles.

Barrasford (Northumberland). — *The Newcastle-on-Tyne Sanatorium*. Res. Med. Supt., Dr. C. G. Reinhardt-Goodwin. Barrasford, N.B.R., 4 miles.

Benenden (Kent).—*Sanatorium* of "National Association for the Establishment and Maintenance of Sanatoria for Workers suffering from Tuberculosis." Res. Med. Supt., Dr. H. Spurrier. Biddenden, 3 miles.

Bingley (Yorks.).—*Eldwick Sanatorium* (West Riding County Council school for phthisical children). Med. Off., Dr. Margaret S. Sharp. Bingley station, 2 miles.

Birmingham. — *Municipal Sanatorium*. Yardley Road. Med. Supt., Dr. G. B. Dixon.

Romsley Hill Sanatorium, Halesowen, near Birmingham. Res. Med. Off., Dr. Hugh G. Trayer. Hunnington, Mid. & G.W.R., 2 miles.

St. Gerard's Tuberculosis Sanatorium, Coleshill, near Birmingham. Boys and girls only. Open-air school attached. Med. Off., J. B. Wall, M.D.

Bolton (Lancs.).—*Wilkinson Sanatorium for Consumptives*, Sharples. Med. Off., Dr. J. D. Marshall.

Bournemouth.—*Royal National Sanatorium for Consumption and Diseases of Chest.* Sec., A. G. A. Major. Res. Med. Off., W. Bertram Lawrence. Bournemouth Central, 1¼ miles; Bournemouth West, ½ mile.

The Firs Home (for advanced cases). Hon. Sec., Col. R. F. Anderson. Hon. Med. Offs., C. P. Woodstock. M.D., and S. G. Champion, M.D. Lady Supt., Miss Ingram. Bournemouth Central, ½ mile.

The Home Sanatorium, West Southbourne, Bournemouth. Res. Med. Supt., J. E. Esslemont, M.B., Ch.B. Bournemouth Central, 2½ miles; Boscombe, 1½ miles; Christchurch, 2½ miles.

See also p. **74**

Bovey Tracey (Devon).—*Hawkmoor Sanatorium.* Med. Supt., Dr. J. C. Smyth.

Bradford.—*Bierley Hall Sanatorium*, Bierley Lane. For women and children only. Res. Med. Supt., Dr. R. F. Chance; and *Odsal Sanatorium.* For men only. Med. Supt., Dr. R. F. Chance.

Bridge of Weir (Renfrewshire).—*Consumption Sanatoria of Scotland.* Hon. Treas., Sir Joseph P. Maclay, Bart., 21, Bothwell Street, Glasgow. Res. Med. Supt., James Crocket, M.D. Bridge of Weir, 2 miles.

Brighton.—*Municipal Sanatorium.* for Brighton townsfolk only (pulmonary and joints). Med. Supt., Dr. Duncan Forbes, M.O.H. for Brighton. Particulars, Town Hall, Brighton.

Chagford (Devon).—*Dartmoor Sanatorium.* Res. Med. Supt., Dr. C. H. Berry. Moretonhampstead G.W.R., 6 miles.

Chelmsford (Essex).—*Great Baddow Sanatorium.* Med. Supt., R. G. Lyster, O.B.E., M.B., B.S. Chelmsford, G.E.R., 4 miles.

Cheltenham.—*Cranham Lodge Sanatorium*, Stroud, Glos. Res. Med. Supts., A. H. Hoffman, M.D., and Geoffrey A. Hoffman, M.B. Cheltenham, 8 miles.

Salterley Grange Sanatorium, near Cheltenham. Res. Med. Supt., Dr. D. J. Peebles. Leckhampton, 2½ miles; Cheltenham, 3¾ miles.

Darlington.—*Felix House*, Middleton St. George, Co. Durham. Res. Med. Supt., C. S. Steavenson, M.B. Dinsdale, N.E.R., 3 minutes.

Derbyshire.—*Ashover Sanatorium.* near Chesterfield. Res. Med. Supt., Dr. James Wall. Stretton, M.R., 3½ miles; Matlock, 4 miles.

Devon and Cornwall *Sanatorium*, Didworthy, South Brent. For consumptives of the two counties. Sec., S. Carlile Davis, Esq., 5, Princess Square, Plymouth. Res. Med. Supt., Dr. W. B. Livermore. Brent, G.W.R., 2 miles.

Doneraile (Co. Cork).—*Cork County and City Sanatorium*, Heatherside. Res. Med. Supt., Dr. R. Ahern. Buttevant, G.S. & W.R., 6 miles.

Dublin.—*Peamount Sanatorium*, Hazelhatch, Dublin. Lucan or Hazelhatch, Gt. Southern Railway.

Dundee (near).—*Sidlaw Sanatorium.* Auchterhouse. Med. Supt., H. E. Fraser, M.D., Royal Infirmary, Dundee. Auchterhouse station, 1½ miles.

Durham.—*Durham County Consumption Sanatoria.* Sec., Mr. F. Forrest, 54, John Street, Sunderland. For men: Stanhope, Med. Supt. John Gray, O.B.E., M.B. Stanhope station, 1 mile. For women and children: Wolsingham, Med. Supt., Dr. E. G. D. Menzies. Wolsingham station, ¾ mile.

Edinburgh.—*Royal Victoria Hospital for Consumption.* Under the Corporation of the City of Edinburgh, and the supervision of the Public Health Department, City Chambers, Edinburgh.

Fortbreda, Belfast.—*Forster Green Hospital for Consumption and Chest Diseases.* Sec., J. Osborne, 99–103, Scottish Provident Buildings, Belfast. Belfast, 2 miles.

Frimley (Surrey).—*Brompton Hospital Sanatorium.* Res. Med. Supt., Dr. R. C. Wingfield. Frimley station, 2 miles.

See also p. **56**

Grange-over-Sands.—*Westmorland Sanatorium*, Meathop. Res. Med. Supt., C. F. Walker, M.D., D.P.H. Grange-over-Sands station, 2 miles.

Harpenden (Herts).—*Sanatorium of the National Children's Home and Orphanage.* Vis. Phys., T. N. Kelynack, M.D. Principal, Rev. Dr. A. E. Gregory, Bonner Road, E. 2.

Hastings.—*Fairlight Sanatorium*, in connection with Margaret Street Hospital for Consumption (for Out-Patients), 26, Margaret St., W. Sec., Mrs. M. C. Hawthorne. Med. Off., Dr. N. F. Stallard. Hastings, tram, about 15 minutes.

Heswall (Cheshire).—*West Derby, Liverpool, and Toxteth Park Joint Sanatorium for Children.* Med. Supt., J. B. Yeoman, M.D. Matron, Miss Bateson. Heswall, 1½ miles.

Huddersfield.—*Bradley Wood Sanatorium*, Bradley. Res. Med. Off., Dr. R. C. Poyser.

Hull.—*Hull and East Riding Convalescent Home*, Withernsea. Sec., Benjamin Brooks, Royal Infirmary, Hull. Med. Off., A. E. Sproulle, L.R.C.P. Withernsea station.

Isle of Wight.—*Royal National Hospital for Consumption*, Ventnor. Res. Med. Supt., Dr. R. R. Fasson. Sec., Charles W. Cox, 18, Buckingham Street, Strand. W.C. Ventnor, 1 mile. *See also p.* 76

St. Catherine's Home, Ventnor (for early cases of phthisis in children). Apply Sister-in-Charge. Med. Off., H. F. Bassano, M.A., M.B. Ventnor, 5 minutes' drive.

Kingussie (Inverness-shire).—*Grampian Sanatorium.* Res. Med. Supt., Dr. Felix Savy. Kingussie, ¾ mile. *See also p.* 76

Kirkcaldy.—*Sanatorium for Consumption.* Med. Supt., Dr. G. W. McIntosh. Sec., The Town Clerk. Kirkcaldy, 1 mile.

Lanark.—*City of Glasgow Sanatorium*, Bellefield, Lanark. Phys. Supt. (*vacant*). Lanark, 20 minutes.

Lanchester (Durham).—*Maiden Law Sanatorium.* Med. Off., Dr. W. M. Morison. Sec., J. J. S. Barker, Lanchester. Annfield Plain station, 1 mile.

Leeds.—*Leeds Sanatorium for Consumptives*, Gateforth, near Selby, and *Leeds Hospital for Consumptives*, Armley. For poor of Leeds. Sec., C. H. Sedgwick, 37, Great George Street, Leeds.

Leysin - Feydey (Switzerland).—*Station Climatérique de Leysin*: Sanatorium Grand Hotel (Dr. Jaquerod), Sanatorium Mont-Blanc (Dr. Piguet), Sanatorium Chamossaire (Dr. Sillig), Sanatorium Belvedère. Leysin-Feydey station, from 1 to 5 minutes. *See also p.* 74

Liverpool.—*Liverpool Sanatorium for Consumptives*, Kingswood. Frodsham; and *Delamere Training Colony*, for tuberculous ex-service men, Frodsham. Sec., Liverpool Hospital for Consumption, Mount Pleasant, Liverpool. Res. Phys., Alfred Adams, M.D. Frodsham, L. & N.W.R., 3½ miles.

Park Hill Sanatorium, Liverpool. Med. Supt., H. R. Macintyre, D.S.O., M.C., M.D.

Llanybyther (Carmarthenshire).—*West Wales Sanatorium.* The Welsh National Memorial to King Edward VII. Res. Med. Supt., Dr. Ida Ferguson. Llanybyther station, 3 miles.

London.—*City of London Hospital for Diseases of the Chest*, Victoria Park, E. 2. Apply, Secretary. Cambridge Heath, G.E.R., Bus or Tram, 5 minutes.

Mount Vernon Hospital for Tuberculosis and Diseases of the Lungs and Heart, Northwood. Northwood (Met. & G.C. Rly.), 1 mile. Res. Phys., Dr. W. G. Kinton. Out-patient department, 7, Fitzroy Square, W. Secretary, W. J. Morton.

Royal Chest Hospital, 231, City Road, E.C. Apply to the Secretary.

Manchester.—*Hospital for Consumption and Diseases of Throat and Chest*, Bowdon; *Crossley Sanatorium*, Delamere, Cheshire. (For poor and working classes, after personal examination at Manchester.) Sec., C. W. Hunt, Manchester.

Margate (Kent).—*Royal Sea-bathing Hospital* (for Surgical Tuberculosis). Sec., A. Nash, 13, Charing Cross, S.W. 1. Margate West, ¼ mile.

Maryborough (Queen's Co.).—*Queen's County Sanatorium.* Sec., G. Dimond.

Matlock (Derbyshire).—*Matlock Sanatorium.* Med. Supt., Dr. F. Kincaid.

Menai Bridge, Anglesey.—*Penhesgyn-y-Gors Sanatorium.* Sister-in-charge, Miss Williams.

Mendip Hills.—*Mendip Hills Sanatorium*, Wells, Somerset. Res. Phys., C. Muthu, and Dr. R. C. Macfie. Wells station, 3 miles. *See also p.* 76

Nordrach-upon-Mendip, Blagdon, nr. Bristol. Med. Supts., R. Thurnam, M.D., and Dr. D. Kennedy (Resident). Burrington station, 5 miles.

Midhurst (Sussex).—*King Edward VII Sanatorium.* Res. Med. Supt., Dr. H. O. Blanford. Midhurst, 4 miles.

Murtle (Aberdeenshire).—*Tor-na-Dee Sanatorium.* Res. Med. Supt., Dr. J. M. Johnston. Murtle, ½ mile.

Nayland (Suffolk).—*Maltings Farm Sanatorium* for poorer men and women patients, *and East Anglian Children's Sanatorium*, Nayland. Med. Supt., Dr. Jane Walker. Bures station, G.E.R., 3½ miles.

New Cumnock (Ayrshire).—*Ayrshire Sanatorium*, Glenafton. Res. Med. Supt., E. E. Prest, M.D. New Cumnock, 3 miles.

Norfolk.—*Children's Sanatorium*, Holt. Vis. Med. Off., Dr. H. F. Skrimshire. Hon. Sec., Mrs. C. Munro, 68, Denison House, Vauxhall Bridge Road, S.W. 1.

Kelling Sanatorium, Holt. Res. Med. Supt., Dr. J. I. W. Morris. Holt, 1½ miles.

Mundesley Sanatorium, Mundesley. Res. Phys., S. Vere Pearson, M.D. Mundesley, 1 mile.

Northampton.—*Northamptonshire Sanatorium*, Creaton. Res. Med. Supt., Dr. C. Milne. Brixworth, L. & N.W.R., 3 miles.

Nottingham. — *Ransom Sanatorium*, Sherwood Forest, Mansfield. Res. Med. Off., Dr. R. R. S. Weatherson. Mansfield, 3 miles.

Nuneaton (near).—*Bramcote Sanatorium*, Bramcote. For men only. Res. Med. Supt., Dr. P. W. Edwards.

Oban, Scotland.—*Argyll County Sanatorium.* Vis. Med. Off., Duncan MacDonald, M.D. Oban, 1 mile.

Oldham.—*Strinesdale Sanatorium.* Med. Supt., Dr. J. B. Wilkinson.

Peebles.—*Manor Valley Sanatorium.* Med. Off., C. B. Gunn, M.D. Peebles, 4 miles, Lyne, 2 miles.

Penmaenmawr (N. Wales).—*Pendyffryn Hall Sanatorium.* Res. Phys., R. Ardra Fegan, M.R.C.S., L.R.C.P. Penmaenmawr, L. & N.W.R., 2 miles. *See also p.* 75

Peppard Common (Oxon).—*Berks. and Bucks. Joint Sanatorium.* Res. Chief Med. Off., Dr. Esther Carling. Reading, 6½ miles.

Ringwood (Hants). — *Linford Sanatorium.* Res. Phys., H. G. Felkin, M.D., A. de W. Snowden, M.D., and H. A. F. Wilson, M.R.C.S. Ringwood sta., 2½ mls.

Rudgwick (Sussex).—*Rudgwick Sanatorium.* Vis. London Phys., Dr. Annie McCall. Rudgwick station, 5 minutes.

Ruthin (N. Wales).—*Vale of Clwyd Sanatorium, Llanbedr Hall.* Res. Med. Supt., H. Morriston Davies, M.D. Ruthin station, 2 miles. *See also p.* 73

St. Leonards.—*Eversfield Chest Hospital*, West Hill. Res. Phys., T. Gambier, M.D. West St. Leonards, S.E.R., West Marina, L.B. & S.C.R., within 5 minutes' walk.

Sandon, near Chelmsford (Essex).—*Merivale Sanatorium.* Med. Supt., H. N. Marrett, M.R.C.S. Chelmsford station, G.E.R., 3½ miles.

Sheffield.—*City Hospitals and School for Consumptives*, Crimicar Lane (for males); Commonside (for females). Med. Supt., H. J. E. H. Williams, M.D.

Shirlett, near Broseley (Shropshire).—*King Edward VII Memorial Sanatorium.* Res. Med. Supt., Dr. G. A. MacDonald. Much Wenlock station, 3 miles.

Skipton (Yorks).—*Eastby Sanatorium for Children.* Res. Med. Supt., Dr. Catherine Arnott. Embsay station, 2 miles.

Stannington (Northumberland).—"*Philipson*" *Children's Sanatorium.* Matron, Miss J. M. Campbell. Stannington station, 3 miles.

Threlkeld (Cumberland). — *Blencathra Sanatorium.* Res. Med. Supt., Dr. W. Goodchild. Threlkeld, C.K. & P.R., 2 m.

Torquay.—*Western Hospital for Incipient Consumption*, Torquay. (*Temporarily closed.*) Sec., W. F. Manley.

Warrenpoint (Co. Down).—*Rostrevor Sanatorium.* Phys., Dr. J. A. O'Tierney. Apply Secretary.

Whiteabbey, Co. Antrim.—*Belfast Municipal Sanatorium.* Res. Med. Supt., S. H. Stewart, M.D.

Wicklow.—*The Royal National Hospital for Consumption for Ireland*, Newcastle, Wicklow. Res. Med. Off., C. Denys Hanan, M.D. D. & S.E.R. to Newcastle, Co. Wicklow, 3 miles.

Winsley, near Bath.—*Winsley Sanatorium.* Senr. Res. Med. Off., Dr. Chas. H. Pedley. Sec., Frederic Jones. Limpley Stoke station, 1 mile.

Woking (Surrey).—*St. Katherine's*, Hook Heath. Res. Med. Supt., Dr. A. R. Snowdon.

Worcester (near).—*King Edward VII Memorial Sanatorium*, Knightwick. Free to County patients. Res. Med. Supt., Dr. H. Gordon-Smith. Knightwick, G.W.R., 1½ miles.

HYDROPATHIC ESTABLISHMENTS.

Baslow (Derbyshire).—*Grand Hotel and Hydro.* Man., A. C. Mercer. Bakewell (M.R.), 4 mls.; Grindleford (M.R.) 5½ mls.

Ben Rhydding (Yorkshire).—*Ben Rhydding Hydro.* Res. Phys., G. Cooper, M.D. Station, a few hundred yards.

Birmingham.—*The City Hydropathic and Massage Establishment*, 275, Broad Street. Proprietor, Robert Schenkel (*Swiss*). *See also p.* 80

Bournemouth (Hampshire). — *Bournemouth Hydropathic.* Res. Med. Supt., W. J. Smyth, M.D. East station, 1½ miles; West station, ¼ mile.

Durley Dean Hydro, Bournemouth. Manager, W. J. Evans.

Linden Hall Hydro, Bournemouth. Apply Manager.

Bristol. — *The Bristol Hydropathic*, College Green. Res. Phys., W. J. Spoor, M.B., M.R.C.S. Temple Meads, 1¼ miles.

Bute.—*Kyles of Bute Hydropathic*, Port Bannatyne, Rothesay. Man., A. Menzies. Clyde steamers call daily.

Buxton.—*Buxton Hydro Hotel.* Manager, G. W. Bosworth. Station, 4 mins.

Haddon Hall Hydro, Buxton. Proprietor, F. M. Osborn.

Caterham (Surrey).—*Caterham Sanitarium and Hydropathic.* Res. Med. Supt., Dr. A. E. Druitt. Caterham station, 5 minutes' walk.

Clifton (near Bristol).—*Clifton Grand Spa Hotel and Hydro.* Clifton Down station, 1 mile: Bristol station, 1½ miles. Props., Mr. and Mrs. F. J. Price.

Cork—*St. Ann's Hill Hydropathic.* Res. Med. Supt., Dr. R. H. Barter, O.B.E. Blarney, 2¾; Cork, 8 miles. *See also p.* **85**

Crieff.—*Strathearn Hydro.* (17 miles from Perth). Res. Med. Supt., T. Gordon Meikle, M.B., C.M. Crieff station, 1 mile.

Eastbourne.—*Eastbourne Hydro Hotel.* Med. Supt., Dr. Kenneth Fraser. Eastbourne, L.B. & S.C.R., 1 mile.

Edinburgh.—*Hydropathic,* Slateford.

Forres.—*Cluny Hill Hydropathic.* Vis. Phys., Dr. John Adam. Forres station, 1 mile; Inverness, 24 miles.

Grange-over-Sands.—*Hazlewood Hydro.* Carnforth, L. & N.W.R., then by Furness Railway; Grange-over-Sands, ¼ mile.

Harrogate (Yorkshire).—*Harlow Manor Hydro.* Man., C. H. Parr.

The Harrogate Hydropathic Lim. Phys., Dr. Hinsley Walker. Man., W. Taylor. Harrogate station, ½ mile.

Hexham (Northumberland).—*Tynedale Hydropathic.* Prop., F. G. Grant. Med. Supt., Dr. D. Stewart. Hexham, 1 mile: Newcastle, 19 miles.

Ilfracombe.—*The Cliffe Hydro.*

Ilkley (Yorkshire).—*Craiglands Hydro.* Res. Phys., Maurice R. Dobson, O.B.E., M.B., B.S. (Lond.), L.R.C.P., M.R.C.S. (Eng.). *See also p.* **82**

The Spa Hydro. Hotel, Ilkley. Man., J. S. Brodie. Vis. Phys., Dr. Henry Veale. Ilkley, 3 minutes.

Limpley Stoke (near Bath).—*West of England Hydropathic.* Apply, the Secretary. Limpley Stoke station.

Malvern.—*Wyche-side Hydropathic,* Malvern. Malvern Wells station, G.W.R., ½ mile; Great Malvern station, 2 miles.

Matlock.—*Rockside Hydropathic,* Matlock. Res. Med. Supt., Dr. Marie Goodwin-Orme. Man. Directors, Miss Goodwin and Mr. John G. Goodwin. Matlock, ½ mile.

Smedley's Hydropathic, Matlock. Res. and Vis. Physicians. Matlock station, ½ mile; omnibus. *See also p.* **83**

Moffat.—*The Moffat Hydropathic.* Man., Miss Gardner. Med. Supt., Dr. D. Huskie. Moffat station, 1 mile.

Peebles.—*Peebles Hotel Hydropathic.* Res. Phys., K. R. Collis Hallowes, M.B., B.Ch. N.B. and Cal. stations about 10 to 15 minutes' walk. *See also p.* **81**

Southport (Birkdale Park).—*Smedley Hydropathic.* Phys., J. G. G. Corkhill, M.D. Southport or Birkdale stations. *See also p.* **80**

Kenworthy's Hydropathic, Southport. Phys., Dr. Kenworthy. Chapel Street (L. & Y.); Lord Street (Cheshire Lines). Telephone, 80. Tel.: "Kenworthy's, Southport." *See also p.* **79**

Tunbridge Wells.—*The Spa Hotel.* Station about 1 mile. Apply, Manageress.

Ulverston.—*Conishead Priory Hydropathic.* Visiting Physician, Dr. Robert Ashburner. Ulverston station, 1¾ miles.

NURSING INSTITUTIONS AND TRAINING INSTITUTIONS FOR NURSES.

Liverpool.—*Male and Female Nurses' Institution,* Hope House, Hope Street. Sec., Jno. Kynaston. *See also p.* **78**

London.—*Cavendish Temperance Male Nurses' Corporation Lim.,* 43, New Cavendish St., W. 1; 23, Upper Baggot St., Dublin; 28, Windsor Terr., Glasgow; and 176, Oxford Rd., Manchester. *See also p.* **71**

Chartered Society of Massage and Medical Gymnastics, 157, Great Portland Street, W. Sec., Miss Templeton. *See also p.* **66**

Male Nurses' Association, 29, York Street, Baker Street, W. 1. Sec., W. J. Hicks. *See also p.* **67**

New Mental Nurses' Co-operation, 139, Edgware Road, Marble Arch, W. *See also p.* **70**

Norfolk Square Nursing Association, and Hyde Park Association, 49, Norfolk Square, W.2. Lady Supt., Miss Jean Hastie. Paddington, 7 minutes. *See also p.* **68**

Nursing Sisters' Institution, 10, Collingham Road, S.W. 5. Apply, Lady Supt. *See also p.* **71**

St. Luke's Hospital. Trained Nurses for Mental and Nervous Cases. Apply, Lady Supt., 19, Nottingham Place, W. 1; also at 57, Clarendon Road, Leeds. *See also p.* **66**

The Nurses' Association, 29, York Street, Baker Street, W. 1. Sec., W. J. Hicks; Supt., Mrs. Millicent Hicks. *See also p.* **67**

Norwich.—*The Norfolk and Norwich Staff of Nurses Lim.,* 32, Surrey Street, Norwich. Lady Supt., Miss S. C. Thorp. *See also p.* **69**

York.—*The Retreat* (Trained Nurses' Department, for mental and nervous cases only). *See also p.* **100**

PRIVATE HOMES FOR INVALIDS, MATERNITY HOMES, INSTITUTIONS FOR SPECIAL CARE AND TREATMENT.

Aberdeen. — *St. Aubins,* Ruthrieston (Deeside). Private Nursing and Convalescent Home. Apply Matron. *See also p.* 78

Alderley Edge (Cheshire).—*The David Lewis Colony* (for Sane Epileptics), and *Colthurst House School* (for epileptic boys). Res. Director, Alan McDougall, M.D. Alderley Edge, 3 miles. *See also p.* 72

Bath.—*Lansdown Hospital and Nursing Home,* Bath (invalids only; special arrangements for patients suffering from gout, rheumatism, and physical infirmities). Physicians, Dr. Percy Wilde and Dr. Wells-Beville. M. or G.W. stations, 1 mile. *See also p.* 68

Broadstairs.—*Bishopsbourne Home for Tuberculosis.* Apply, Sec. *See also p.* 69

Colinsburgh, Fife.—*Kenlaw House.* Functional nervous diseases. Res. Phys., Dr. W. H. Bryce. *See also p.* 86

Goathland (Yorks).—*Goathland.* Private Sanatorium for Open-air Treatment. Matron, Miss M. Tweedy. *See also p.* 71

Kreuzlingen, Switzerland.—*Dr. Binswanger Sanatorium Bellevue.* For nervous and mental complaints. *See also p.* 73

Leatherhead (Surrey). — *The Royal School for the Indigent Blind.* Principal, Rev. St. Clare Hill, M.A. *See also p.* xli

London.—*Dowsing Medical and Therapeutic Institution,* 91 & 93, Baker Street, W.1; *The Dowsing Nursing Home,* 3, 4 & 5, Dorset Square, N.W.1. *See also p.* 85

The Radium Institute, 16, Riding House Street, W. Med. Supt., A. E. Hayward Pinch, F.R.C.S. *See also p.* 85

Mendip Hills. — *The Court,* Blagdon, near Bristol. Nerve and general medical cases. Matron, Miss Hallen. *See also p.* xli

Pinner (Middlesex).—*St. Vincent's Open-air Hospital and School for Crippled Boys,* Eastcote. Tubercular and other joint diseases, infantile paralysis, etc. Eastcote, Metrop. Rly., 1¾ miles. *See also p.* 73

Sevenoaks.—*The Grey House.* Farm and Garden School for backward, borderline, or nervous girls of gentle birth. Hon. Lady Supt., Mrs. Pearce Clark. *See also p.* 70

Sturry, near Canterbury. — *Bishopsbourne Home for Tuberculosis.* Apply, Secretary. *See also p.* 69

Tunbridge Wells. — *Mount Ephraim Nursing Home.* Medical, surgical, Weir-Mitchell and massage cases. Apply, Miss Baxter. *See also p.* xl

PRINCIPAL BRITISH SPAS,

WITH INDICATIONS FOR THEIR THERAPEUTICAL EMPLOYMENT.

THE BRITISH SPA FEDERATION,

Comprising the Spas of BATH, BUXTON, CHELTENHAM, DROITWICH, HARROGATE, LEAMINGTON, LLANDRINDOD WELLS, WOODHALL, and NEW ZEALAND.

Bath (Somerset).—Sheltered from N. and N.E. winds by hills from 600 to 800 feet high; 2 hours from London. Climate mild and equable. Bath is at its busiest in the autumn, winter and spring months, but has an all-the-year-round season. A winter spa is of priceless value to any country, especially to such a country as Britain where, during the winter months, rheumatism in all its forms is particularly prevalent. During the summer there are some complaints in which Bath proves most efficacious.

Waters.—The only *hot* springs in Britain (120° F.) and the richest natural radio-active mineral waters in this country.

Therapeutic indications.—Specially suitable for all rheumatic and gouty conditions, skin diseases of gouty and rheumatic origin, chronic laryngitis and pharyngitis, and mucous colitis and similar conditions. A detailed list of complaints successfully treated will be sent on application.

Baths.—An extensive and thoroughly equipped bathing establishment. The Queen's Baths and the Old Royal Baths, the Royal Baths (opened 1916) and the New Wing (opened 1919) provide the latest and most approved balneo-therapeutic methods.

Bath *specializes* in the treatments for which its waters are particularly adapted: deep baths (500 gallons of natural hot radio-active water), undercurrent douching, douche massage in many forms, and intestinal lavage (Plombières douches), throat sprays and inhalation of the natural radium emanation. Particulars of the many other treatments given will be sent on request by John Hatton, Director of the Spa, Bath.

Nursing and Baths.—Lansdown Grove House (*See p.* 68).

(*See also p.* xxxvi).

Buxton (Derbyshire).—1000 to 1200 feet above sea-level. The highest town in the United Kingdom ; 3¾ hours from London ; 1 hour from Manchester. Served by Midland and L. & N.W. Railways. Average rainfall 35 inches. Sunshine 1362 hours. Sheltered from east winds. Very bracing air.

Waters.—Simple, highly radio-active, natural temperature 82° F., mainly bicarbonate of calcium and magnesium ingredients. Tasteless, odourless. Chalybeate springs.

Therapeutic indications.—Gout, rheumatism, rheumatoid arthritis, sciatica, and various nervous diseases, neurasthenia, disorders of digestion, and skin diseases, malaria, mucomembranous colitis, arteriosclerosis, phlebitis, diseases of the throat and air-passages ; anæmic conditions, and convalescence from prolonged illness.

Baths.—100 different treatments. All Continental treatments available. Establishments including St. Ann's Well (Pump Room), recently modernized at great cost. Open all the year round. All the latest equipment installed.

Medical Profession, etc.—Complimentary facilities granted to practising medical men and professional nurses.

Boarding Establishment.—The Buckingham (*See p.* **79**).

(*See also p.* xxxvi).

Cheltenham (Gloucestershire).—Protected from N. and N.E. winds by the Cotswold Hills, 184 feet above sea level ; 3 hours from London. Climate soft and mild. Average rainfall 30 inches.

Waters.—Of four kinds : the Fieldholme or Twin Salt Saline, containing nearly equal parts of magnesium sulphate and sodium sulphate : sold in bottles by chemists, under the name of "Chelspa" aperient water ; the Lansdown or Sodium Sulphate Saline, the chief ingredients of which are sulphate and chloride of sodium, closely resembling Kissingen waters ; the Pittville or Alkaline Saline, the only alkaline natural water in Great Britain, very similar in analysis to Carlsbad or Marienbad waters ; and the Chadnor or Magnesium and Calcium Saline, containing a large quantity of sulphate of magnesium and a considerable amount of carbonate and sulphate of calcium.

Therapeutic indications.—The Fieldholme water is most useful in gastric hyper-acidity, sthenic dyspepsia, obesity, plethora, chronic constipation, hemorrhoidal conditions, and glycosuria associated with obesity ; Lansdown water for anæmic dyspeptics, skin affections and chronic gastric catarrh ; Pittville water for congestion of the liver, torpid liver, biliary catarrh, gastroduodenal catarrh and gall-stones, also for mucous colitis, toxæmia, glycosuria, and catarrhal conditions of the intestinal tract ; and Chadnor water for renal disorders, lumbago, myalgia, torticollis, and other forms of fibrositis.

Baths.—An excellent set of baths and douche and massage apartments at the Montpellier Baths, close to the Central Spa. All the latest baths and treatment.

Hotel.—The Montpellier Spa Hotel (*See p.* **84**).

(*See also p.* xxxvii).

Droitwich (Worcestershire).—150 feet above sea level, 2½ hours from London (Paddington), 19 miles from Birmingham, 6 from Worcester. Rainfall about 25 inches. Mean winter temperature 44° F., summer 65° F. The climate is excellent for invalids both in summer and winter. Moderately bracing, but well protected from N. and N.E. winds.

Waters.—The most powerful saline in the world. The brine is pumped from the triassic formation 200 feet below the ground level. Temperature 54° F., and is heated by introducing steam. It is 10 to 12 times as strong as that of the ocean (Channel), containing in every gallon 20,000 grains of saline in excess of other European waters : the waters are radio-active and radio-emanative.

Therapeutic indications.—Chronic muscular and articular rheumatism, rheumatoid arthritis, chronic articular or irregular gout, neuritis, sciatica, neuralgia, heart diseases, especially those of myocardium—effect similar and equal to Nauheim treatment, or the Nauheim treatment, on the most approved principles, is given if prescribed—neurasthenia, anæmia, chlorosis, some sclerotic diseases of spinal cord, dry, scaly skin diseases, e.g., chronic eczema and psoriasis. Moist eczema is contra-indicated.

Baths.—Reclining, douche, needle, vapour, swimming, Aix-douche, Nauheim baths, brine-pine or Homburg baths, etc.

Hotel.—Worcestershire Brine Baths Hotel. (*See p.* **82**).

(*See also p.* xxxvii).

Harrogate (Yorkshire).—600 feet above sea level, 4½ hours from London. Unequalled by any Continental spa, especially for the treatment of gout and its complications. The climate is stimulating and fairly dry—bracing moorland air. Average rainfall 29 inches. Mean temperature 46° F.

Waters.—Celebrated for the medicinal properties of its 87 springs—sulphurous, chalybeate, alkaline, and saline. 'Aquaperia' aperient mineral water is bottled from a Spring at Harrogate by Camwal Ltd. (*See p.* **143**).

Baths.—There are five establishments, where nearly 100 treatments are given, including all the Continental systems and others. The staff of 200 are all medically trained, and the masseurs, etc., fully certificated. The waters are continually under scientific control by the highly qualified scientific officer on the permanent staff. Harrogate also possesses its own pathologist and bacteriologist, *x*-ray expert, etc.

The surrounding country is unsurpassed for beauty and interest, and the amusements and recreations are of the highest order.

(*See also p.* xxxviii).

Leamington Spa (Warwickshire).—195 feet above sea level; 98 miles from London. Equable and mild climate. Average rainfall 24 inches. Mean annual temperature 49·50. Westerly winds prevail.

Waters.—Radio-active saline springs, resembling those of Homburg, but more generally useful.

Therapeutic indications.—Muscular and articular rheumatism, gout, rheumatoid arthritis, neuralgia and neuritis, diseases arising from a plethoric condition of the chylopoietic viscera, eczema and other irritative disorders of the skin, conditions of increased vascular tension, and chronic interstitial nephritis.

Baths.—Turkish, 'whirlpool,' swimming, and electric of all kinds.

(*See also p.* xxxviii).

Llandrindod Wells (Radnorshire).—Situated amidst beautiful mountain and river scenery in Mid-Wales at an altitude of 750 feet above sea-level. Climate exceedingly bracing, but sheltered from east winds, and with an average rainfall of about 35 inches. About 5 hours distant from London, on the main L. & N.W. Railway about mid-way between Shrewsbury and Swansea.

Waters.—Celebrated for the variety and efficacy of its numerous medicinal springs. Saline, sulphur and radium-sulphur, magnesium, lithia saline and chalybeate. Slightly aperient and strongly diuretic.

Therapeutic indications.—Digestive disorders, gout and rheumatism, rheumatoid arthritis, neuritis and fibrositis, gall-stones and biliary stasis, renal calculus or any kidney or bladder condition requiring diuresis, and in neurasthenia or debility from overwork.

Baths.—Sulphur, immersion, needle and douche; Aix and Vichy douche and massage; Scotch douche; Nauheim; medicated baths; Fango and peat baths; whirlpool and agitation baths; almost every known form of electrical treatment by fully qualified staff.

Hotel.—Ye Wells Hotel. (*See p.* **84**).

(*See also p.* xxxix).

Woodhall Spa (Lincolnshire).—50 feet above sea level. 3 hours from London. Average rainfall, 22½ inches. The air, bracing and uncontaminated, sweeping across the Lincolnshire wolds from the sea, is soothing and curative, bringing restful sleep to jaded nerves. The quiet simplicity of Woodhall Spa is in itself a distinction.

Waters.—Bromo-iodine waters, rich in the chlorides of sodium, calcium, and magnesium, with bromine and iodine.

Therapeutic indications.—Rheumatism (chronic articular and muscular), lumbago, arthritis deformans, gouty arthritis, sciatica, neuritis, paralysis, neurasthenia; injuries to joints; skin diseases, psoriasis, urticaria; diseases peculiar to women; diseases of throat and dose; liver disorders. Not only is Woodhall Spa the place to visit in cases of rheumatism, gout, or any of the diseases mentioned; but those who are suffering from overwork and nerve-strain will find it a delightful holiday resort.

Spa Baths.—Recently enlarged. Immersion, shower, undercurrent and local douches; Aix and Vichy douche massage; Nauheim, electric and Schnee baths; Dowsing radiant heat and light baths; Bergonié treatment; nose, throat, and eye mineral sprays and douches; Russian and Berthollet vapour; electric, ionic, and *x*-ray treatments; paraffin-wax treatment; massage and Swedish exercises. There are 60 acres of grounds surrounding the Pump Room. Particulars, apply Secretary.

Hotel.—The Spa Hotel (*See p.* **79**).

(*See also p.* xxxix).

New Zealand Spas.—The mineral waters of New Zealand are famed both for their great variety and for their powerful therapeutic properties. Many of them are almost unique: quite unlike any European waters; others are of kinds familiar in Europe, but stronger in mineralization than the most famous Continental waters. The principal spas are:—

ROTORUA.—A first-class, well-equipped spa, with complete modern bathing establishment and limitless supply of *Sulphur waters* of two main types: alkaline sulphur, containing sodium chloride, bicarbonate, and silicate: and acid sulphur, containing sulphuric acid, and used for baths only. There are mud baths supplied from the *boiling mud springs*, corresponding to the fango treatment of Italy, and natural vapour baths. The massage and electrical department is thoroughly up to date. The whole establishment is under Government management, and skilled medical attendance is provided. As Rotorua is the centre of the thermal district, numerous minor spas are within easy reach, providing primitive but most excellent baths.

Climate and Season.—The latitude corresponds to that of the south of Spain, but the spa being 1000 ft. up, the climate is by no means hot. Season from October to May, but baths open all the year round.

Accommodation.—Several hotels and numerous boarding houses.

Access by train from Auckland or Wellington.

Te Aroha.—Hot *alkaline waters* of the Vichy type, but double the strength. There are comfortable baths, but this is essentially a place for drinking the waters, which are unique in their strength of sodium bicarbonate.

Climate.—Mild and sedative.

Accommodation.—Several hotels and boarding houses.

Access by train, branch from Rotorua line.

Hanmer.—In the South Island: has mild sulphur baths and a bracing climate.

There are numerous smaller resorts only partly developed, with valuable *iodine saline, chalybeate, carbonic acid*, and other waters, and a choice of climate from mild subtropical to bracing Alpine.

(*See also p.* xl).

OTHER BRITISH SPAS.

Bridge of Allan (Stirlingshire).—422 miles from London. Sheltered from N. and N.E. winds by the Ochil Hills. Average rainfall 33 inches. Climate mild and equable.

Waters.—Natural saline mineral springs (Airthrey).

Therapeutic indications.—Chronic affections of the liver, stomach, and bowels, in many chest diseases, rheumatism, gout, sciatica, and in some diseases of the skin.

Baths.—Excellent suite of baths.

Church Stretton (Salop).—613 feet above sea level. 153 miles from London. Pure bracing air, and a generally invigorating climate. Prevailing wind, S.W. Average rainfall 33 inches.

Waters.—Said to be the purest in Great Britain.

Therapeutic indications.—Specially the 'open-air' cure of neurasthenia, for sequelæ of influenza, for insomnia, functional nervous diseases, chronic gout and rheumatism, chronic gastric and bronchial catarrh, debility from over-work, and convalescence after illness or operation.

Ilkley (Yorkshire).—Situated on the southern slope of the valley of the Wharfe. 18 miles from Harrogate. Occupying a sheltered position. Average rainfall 32 inches. Mean annual temperature, 48° F. Bracing and invigorating moorland air.

Waters.—The water supply obtained from springs is remarkably pure, bright and sparkling. Chalybeate waters. Saline.

Therapeutic indications.—Gout, rheumatism, neuritis, neurasthenia, anæmia, asthma, and bronchitis cases are benefited. The treatment adopted is that known as hydrotherapeutic.

Baths.—Complete suites of baths are to be found in the numerous establishments. Electrical, Weir-Mitchell.

Hydropathic Establishment.—Craiglands Hydropathic. (*See p.* 82).

Llangammarch Wells (Breconshire).—600 feet above sea level. 215 miles from London. Well protected from the east, and prevailing wind is S.W.

Water.—Saline, containing the chlorides of barium (6¾ grains per gallon), calcium, magnesium, lithium, and sodium; the only one of its kind in the British Isles.

Therapeutic indications.—Cardiac diseases, organic and inorganic, especially affections of the myocardium due to influenza. Graves' disease, chronic muscular and articular rheumatism, osteo-arthritis, gout, sciatica, and neurasthenia.

Hotel.—Lake Hotel (*See p.* 79.)

(*See also p.* 79).

Malvern (Worcestershire).—520 feet above sea level. 122 miles from London. Air dry and bracing. Prevailing winds S.W. and W. Average rainfall 27 inches. Mean temperature about 49° F.

Waters.—Mainly spring, of remarkable purity, free from organic matter, less than 4 grains of earthy salts per gallon.

Therapeutic indications.—Gout, rheumatism, rheumatoid arthritis, neuralgia, sciatica, lumbago, dyspepsia, constipation, anæmia, bronchial, nephritic, and cutaneous diseases.

Baths.—Natural pure brine (from Droitwich), Turkish and electric baths. Vichy massage and Aix douches. Fango-di-Battaglia.

Matlock Bath (Derbyshire).—300 to 800 feet above sea level, 143 miles from London. Average rainfall 36 inches. Mean temperature about 46° F. Very sheltered.

Waters.—Thermal springs. Mild sulphated alkaline—saline waters at 68° F., containing 33 grains per gallon of salts, mainly magnesium and calcium bicarbonate, and magnesium sulphate.

Therapeutic indications.—Rheumatism, gout, rheumatoid arthritis, neuritis, neurasthenia, catarrhs (bronchial, gastric, or enteric), anæmia. cardiac asthenia, chronic diseases of the liver or kidneys, digestive and biliary disorders.

Baths.—A complete modern installation exists for the administration of all kinds of baths, douches, packs, and other hydropathic treatment, electricity, massage, inhalations, Nauheim baths, with Swedish exercises.

Matlock Bank (*Matlock* station, one mile by rail from Matlock Bath).—South-westerly aspect, and well sheltered from the north. Climate mildly bracing. Sunshine above the average. The Matlock system of hydropathic treatment is carried out in all its branches, and the principal hydros are installed with latest electric baths and appliances, including high-frequency, Dowsing radiant heat and light, Schnee four-cell, *x* rays, etc. They also include Turkish, Russian, plunge, medicated, and inhalation baths, Aix and Vichy douches.

Hydropathic Establishment.—Smedley's Hydropathic (*See p.* **83**).

Peebles (Peebleshire, N.B.).—500 ft. above sea level. One hour from Edinburgh and 382 miles from London. Rainfall, 27 inches. Bracing climate, but sheltered from the north winds.

Waters.—The chief ingredient is chloride of sodium. They are obtained from the famous St. Ronan's Well (6 miles east).

Therapeutic indications.—The waters are specially suited to the Nauheim and Bourbon Lancy treatment of cardiac disease, dyspepsia, gout, rheumatism, and neurasthenia.

Baths.—The baths at the hydropathic are of the most modern type. Complete electrical installation and mud baths (Fango-di-Battaglia).

Hydropathic Establishment.—Peebles Hotel Hydropathic (*See p.* **81**).

See also p. **80**.

Ripon (Yorkshire).—120 feet above sea level. 4¾ hours from London. Climate mild but bracing. Prevailing winds, W. and S.W.

Waters.—Saline sulphur water from Aldfield Spa, 4 miles distant.

Therapeutic indications.—Chronic and subacute gout, rheumatism, rheumatoid arthritis, chronic skin diseases (eczema, psoriasis, acne), catarrhs, gastric and liver derangements.

The Baths have been lately equipped with up-to-date electric apparatus.

Strathpeffer Spa (Ross-shire, N.B.).—180 to 300 feet above sea level. Sheltered from N. and N.E. winds. Prevailing wind S.W. Bracing air. Average rainfall 31 inches. Mean annual temperature 45° F.

Waters.—Sulphurous and chalybeate. Sulphates the predominating salt. Have strong diuretic and mild aperient action.

Therapeutic indications.—Chronic gout and rheumatism, rheumatoid arthritis, chronic skin diseases, chronic disorders of the digestive system, chronic gastric or intestinal catarrh, sluggish portal circulation, congested liver, biliary and urinary calculi, and neurasthenia.

Baths.—Sulphurous (immersion), inhalation, peat, douche (Aix and Vichy), needle, pine, Russian, Nauheim, Plombières, radiant heat (electric), and high-frequency current.

Trefriw Wells (Carnarvonshire).—5 hours from London. The climate is bracing, the air soft, pure, and mostly of a westerly or south-westerly type.

Waters.—Two varieties: (1) The aluminous chalybeate, and (2) the sulpho-magnesian chalybeate. Used internally, and externally in the form of baths.

Therapeutic indications.—Curable forms of anæmia, nervous, debilitating and wasting diseases, rheumatism, sciatica, gout, and neuritis.

Tunbridge Wells (Kent).—400 feet above sea level. 1 hour from London. Climate is tonic and invigorating. Prevailing winds W. and S.W.

Water.—A weak non-aerated, chalybeate spring, containing 4 grains ferrous carbonate to the gallon, with sulphates and chlorides of potash, soda, and calcium.

Therapeutic indications.—Waters indicated in anæmia, chlorosis, and allied conditions.

Baths.—Immersion, douche, needle, Turkish, Russian, vapour, swimming, medicated, and electric light.

Nursing Home.—Mount Ephraim Nursing Home (*See p.* xl).

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Hygiene, Journal of—Quarterly, 12/6—Cambridge University Press, Fetter Lane, E.C.4.

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Bell (John) & Croyden Lim. (incorporating Arnold & Sons), 50, Wigmore Street, W.1, and Giltspur Street, E.C.1
Braid, A. E. & Co. Lim., 30, Gower Place, Gower Street, W.C.1
Coxeter & Son, 171, Pancras Road, N.W.1
Critchley, J. & Sons, 18, Great George Street, Liverpool
Curtis, H. E. & Son Lim., 8, Old Cavendish Street, W.1
Cuxson, Gerrard & Co. Lim., Oldbury, Birmingham
Dental Manufacturing Co. Lim., Alston House, Newman Street, W.1
Domen Belts Co. Lim., 456, Strand, W.C.2
Down Bros. Lim., 21 & 23, St. Thomas's Street, S.E.1
Evans, A. E., 38, Fitzroy Street, W.1
Ferris & Co. Lim., Bristol
Gardner, J. & Son, 32, Forrest Road, Edinburgh
Genito-Urinary Mfg. Co. Lim., 66, Margaret Street W.1
Grossmith, W. R., 12, Burleigh Street, W.C.2
Harris (Philip) & Co. (1913) Lim., Edmund Street, Birmingham
Hawksley & Sons, 351, Oxford Street, and 83, Wigmore Street, W.1
Haywood, J. H. Lim., Castle Gate, Nottingham
Holborn Surgical Instrument Co. Lim., 26, Thavies Inn, E.C.1
Holland & Son, 46, South Audley Street, W.1 (Foot Supports)
Holman, William, 29, Beauchamp Place, Brompton Road, S.W.3
Hospitals Contracts Co. Lim., 25–35, Mortimer Street, W.1
Maw, S., Son & Sons Lim., 7–12, Aldersgate Street, E.C.1
Mayer & Phelps, 59 & 61, New Cavendish Street, W.1
Medical Supply Association Lim., 167–185, Gray's Inn Road, W.C.1
Millikin & Lawley, 165, Strand, W.C.2
Montague, J. H., 69, New Bond Street, W.1
Reynolds & Branson Lim., 13, Briggate, Leeds
Rudolph, O. C. & Beesley, 65, Margaret Street, W.1
Salmon Ody Lim., 7, New Oxford Street, W.C.1 (Trusses and Foot Supports)
Salt & Son Lim., 5 & 6, Cherry Street, Birmingham
Schaerer Ste. Ame., M., 41, Berners Street, W.1
Sumner, R. & Co. Lim., 40, Hanover Street, Liverpool
Surgical Manufacturing Co., Lim., 83–85, Mortimer Street, W.1
Tintometer (The) Lim., Salisbury
Weiss, John & Son Lim., 287, Oxford Street, W.1
Woolley, Jas. Sons & Co. Lim., Victoria Bridge, Manchester
Young, Arch. & Son, 57–61, Forrest Road, Edinburgh

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Zeal, G. H. Lim., 82, Turnmill Street, E.C.1

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NOTE BOOK.

It is easier to make a note of a thing than to remember *where* the note was made. If entered in the following pages any note can be immediately found when required.

1922

JANUARY.					
S	1	8	15	22	29
M	2	9	16	23	30
Tu	3	10	17	24	31
W	4	11	18	25	•
Th	5	12	19	26	•
F	6	13	20	27	•
S	7	14	21	28	•

NOTES.

Copy here any formula or fact you wish to keep for reference.

1922

FEBRUARY					
S	•	5	12	19	26
M	•	6	13	20	27
Tu	•	7	14	21	28
W	1	8	15	22	•
Th	2	9	16	23	•
F	3	10	17	24	•
S	4	11	18	25	•

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1922

MARCH.					
S	•	5	12	19	26
M	•	6	13	20	27
Tu	•	7	14	21	28
W	1	8	15	22	29
Th	2	9	16	23	30
F	3	10	17	24	31
S	4	11	18	25	•

NOTES.

1922

APRIL.						
S	•	2	9	16	23	30
M	•	3	10	17	24	•
Tu	•	4	11	18	25	•
W	•	5	12	19	26	•
Th	•	6	13	20	27	•
F	•	7	14	21	28	•
S	1	8	15	22	29	•

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DR BARNARDO'S HOMES
IS
"NO DESTITUTE CHILD EVER REFUSED ADMISSION."
HEAD OFFICES:—18–26 STEPNEY CAUSEWAY, LONDON, E. 1
See Advertisement, p. xlii.

1922

MAY.					
S	•	7	14	21	28
M	1	8	15	22	29
Tu	2	9	16	23	30
W	3	10	17	24	31
Th	4	11	18	25	•
F	5	12	19	26	•
S	6	13	20	27	•

NOTES.

1922

JUNE.					
S	•	4	11	18	25
M	•	5	12	19	26
Tu	•	6	13	20	27
W	•	7	14	21	28
Th	1	8	15	22	29
F	2	9	16	23	30
S	3	10	17	24	•

GEORGE SPILLER Ltd. *Estab. 1874.*

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See Advertisement, page xv. Phone: Mayfair 636, 648.

1922

JULY.						
S	•	2	9	16	23	30
M	•	3	10	17	24	31
Tu	•	4	11	18	25	•
W	•	5	12	19	26	•
Th	•	6	13	20	27	•
F	•	7	14	21	28	•
S	1	8	15	22	29	•

NURSES.

Note whether Midwifery or Sick Nurses, their terms and addresses.

1922

AUGUST.						
S	•	6	13	20	27	
M	•	7	14	21	28	
Tu	1	8	15	22	29	
W	2	9	16	23	30	
Th	3	10	17	24	31	
F	4	11	18	25	•	
S	5	12	19	26	•	

The FRENCH NATURAL MINERAL WATER
VICHY-CÉLESTINS
— FOR —
GOUT, RHEUMATISM, and LIVER COMPLAINTS.
See Advertisement, page 582.

1922

SEPTEMBER.					
S	*	3	10	17	24
M	*	4	11	18	25
Tu	*	5	12	19	26
W	*	6	13	20	27
Th	*	7	14	21	28
F	1	8	15	22	29
S	2	9	16	23	30

ADDRESSES (PRIVATE).

1922

OCTOBER.					
S	1	8	15	22	29
M	2	9	16	23	30
Tu	3	10	17	24	31
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Th	5	12	19	26	*
F	6	13	20	27	*
S	7	14	21	28	*

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See full announcement on page xlviii.

An Elegant and Effective Preparation for
GASTRO-INTESTINAL
DISTURBANCE COMPLICATED
WITH VOMITING.

GILES, SCHACHT & CO., CLIFTON, BRISTOL.

1922

NOVEMBER.					
S	•	5	12	19	26
M	•	6	13	20	27
Tu	•	7	14	21	28
W	1	8	15	22	29
Th	2	9	16	23	30
F	3	10	17	24	•
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NOTES.

1922

DECEMBER.						
S	•	3	10	17	24	31
M	•	4	11	18	25	•
Tu	•	5	12	19	26	•
W	•	6	13	20	27	•
Th	•	7	14	21	28	•
F	1	8	15	22	29	•
S	2	9	16	23	30	•

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1923

JANUARY					
S	*	7	14	21	28
M	1	8	15	22	29
Tu	2	9	16	23	30
W	3	10	17	24	31
Th	4	11	18	25	*
F	5	12	19	26	*
S	6	13	20	27	*

NOTES.

1923

FEBRUARY.					
S	*	4	11	18	25
M	*	5	12	19	26
Tu	*	6	13	20	27
W	*	7	14	21	28
Th	1	8	15	22	*
F	2	9	16	23	*
S	3	10	17	24	*

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Classified Index to Advertisements

PAGE

ACCOUNT BOOKS AND CARD INDEX SYSTEM (MEDICAL)—
McQueen, J. 17
Wright, John & Sons Ltd. 12, 65

ART GALLERIES—
Museum Galleries 592

ARTIFICIAL LIMBS, EYES, Etc.—
Alexander & Fowler 116
Critchley, J. & Sons 118
Grossmith, W. R. 103
Halford, Wm., Senr. (Eyes) 122
Haywood, J. H., Ltd. 118
Kenney Limb Co. Ltd. 119
Salt & Son Ltd. 591
Weiss, John & Son Ltd. 124

ASSURANCE ADVICE—
Tidswell, Ernest, M.A., F.F.I. 6

ASSURANCE OFFICES, Etc.—
Australian Mutual Provident Society .. 11
Britannic Assurance Co. Ltd. 8
Co-operative Insurance Society Ltd. .. 10
Eagle Star and British Dominions Insurance Co. Ltd. 9
Equity and Law Life Assurance Society 64
General Life Assurance Co. 10
Medical Sickness Annuity and Life Assurance Society Ltd. 10
Prudential Assurance Co. Ltd. 11
Tidswell, Ernest, M.A., F.F.I., Life Assurance Consultant 6
Wesleyan and General Assurance Society 8
Yorkshire Insurance Co. Ltd. 2

ASYLUMS—(*see* "Mental Institutions", etc.)

BATHS—(*see* "Hydro-Therapeutic Establishments", etc.)

BEDS (HOSPITAL)—
Hoskins & Sewell Ltd. xliii

BOOK ANNOUNCEMENTS—
(*see* Index to Books and Periodicals, with Authors' names, page 593)

BOOKSELLERS (MEDICAL)—
Bryce, Wm. 14
Deighton, Bell & Co. Ltd... 15
Foyle, W. & G. Ltd. 18
Galloway, James 15
Lewis, H. K. & Co. Ltd. .. 22, 23
Thin, James xxxiv

BOTTLES AND VIALS—
Isaacs, I. & Co. 120
Jessop, H. 104

BRANDIES, WINES, SPIRITS, Etc.
Brown, Gore & Co., Brandies xxiv
Gautier Frères' Brandies xxiv
Rattray, A. Dewar, Whisky xxvii

BUILDINGS (PORTABLE, Etc.)—
Beattie, G. W. (Venetian Shelters, etc.) .. 104
Bell's United Asbestos Co. Ltd. (Flooring Composition for Hospitals, etc.) .. 115
Hobson, J. T. & Co. (Revolving Shelters) 120

PAGE

CARD INDEX SYSTEM AND CABINETS FOR MEDICAL ACCOUNTS.—
Wright, John & Sons Ltd. 579

CHEMICAL PREPARATIONS, DISINFECTANTS, Etc.—
Allen & Hanburys Ltd. 131
Alliance Drug & Chemical Co. 132
Bengué (Dr.) & Co. 133
British Colloids Ltd. xxix
British Organotherapy Co. Ltd. .. xxxiii
Clayton Aniline Co. Ltd. 130
Crookes' Laboratories xxix
Drug & Chemical Corporation Ltd. xxxii
Duncan, Flockhart & Co. .. xxviii
Fellows Medical Mfg. Co., Inc. .. xxviii
Ferris & Co. Ltd. Back End Papers and 128
Fletcher, Fletcher & Co. Ltd., Endolytic Tubes for Urine Testing.. 124
Gibbs, D. & W. Ltd., Dentifrice 141
Giles, Schacht & Co. .. .. xlviii, 578
Harkness, Beaumont & Co. 140
Hewlett, C. J. & Son Ltd. 138
Hoffmann-La Roche Chemical Works Ltd. xxx, xxxi
Kerol Ltd., Disinfectants and Antiseptics xlv
Kolynos Incorporated, Dental Cream .. 129
May, Roberts & Co. Ltd. .. xxii, 140
Menley & James Ltd. 1
Midgley, Charles Ltd. 135
Oppenheimer, Son & Co. Ltd. .. xxiii
Parke, Davis & Co. xxi
Pearson, E. T. & Co. Ltd. 581
Peat Products (Sphagnol) Ltd. .. xxiii
Phillips, Chas. H., Chemical Co. 139
Reliance Lubricating Oil Co. Ltd., Disinfectants, etc. 139
Reynolds & Branson Ltd. xvii
Rigollot's Mustard Leaves xxii
Salamon & Co. Ltd. 142
S. P. Charges Co., Sulphaqua 142
Sumner, R. & Co. Ltd. vii
Symes & Co. Ltd. 142
Tamar Indien Grillon xxii
Valentine's Meat-Juice Co. Front End Paper
Whiffen & Sons Ltd. 138
Willows, Francis, Butler & Thompson Ltd. 137
Woolley, James, Sons & Co. Ltd. 137
Wyleys Ltd. 131

DENTAL APPLIANCES—
Ash, Claudius, Sons & Co. Ltd. 129
Dental Manufacturing Co. Ltd 124
Gibbs, D. & W. Ltd., Dentifrice .. 141
Kolynos Incorporated, Dental Cream .. 129

DIABETIC PREPARATIONS—
Callard & Co. 136

EDUCATIONAL INSTITUTIONS, SCHOOLS, TUTORS, Etc.—
Barnardo's (Dr.) Homes .. .. xlii, 575
Behnke, Miss (Speech Defects) 12
Chartered Society of Massage and Medical Gymnastics, W. 1 66
Colthurst House School for Epileptic Boys, Warford 72
Grey House, Sevenoaks (Farm and Garden School for Backward Girls) 70

PAGE
EDUCATIONAL INSTITUTIONS, ETC.—*continued.*
Medical Correspondence College 65
Normansfield, Hampton Wick (Mentally Deficient) 72
Royal Albert Institution, Lancaster (Feeble Minded Children) 72
Royal School for the Indigent Blind, Leatherhead xli
Schnelle, A. C. (Stammering) 69
Scurr, C. A., M.P.S., F.S.M.C.(Lond.), F.I.O. (Correspondence Course in Sight-Testing) 127
St. Vincent's Open-Air Hospital and School for Crippled Boys, Pinner 73
Stoke Park Colony, Bristol (Mentally Defective Children) 70
University Examination Postal Institution 61

ELECTRO-MEDICAL APPARATUS—
Dean, A. E. & Co. xii
Medical Supply Association Ltd. 110, 111
Mottershead & Co. xiii
Rogers Electric Sales Co. (Great Britain) ii
Schaerer Ste. Ane., Maison M. 115

ENGRAVERS—
Art Reproduction Co. Ltd 13
Swain, John & Son Ltd. 12

FILTERS—
London Filter & Pump Co. Ltd. .. xliv

FLOORING FOR HOSPITALS, Etc.—
Bell's United Asbestos Co. Ltd. (Decolite Flooring) 115

FOODS, MILKS, Etc.—
Brand & Co. Ltd., Beef Essence, etc. .. xxv
Cadbury's Bournville Cocoa 113
Callard & Co., Diabetic Foods, etc. .. 136
Hugon & Co. Ltd., "Atora" Suet xxvii
Kond's Cocoa 110
Lactomaltine (Harkness, Beaumont & Co.) 110
Lynwood's Ltd., Teas xxii
Oxo Ltd. xlvi
Valentine's Meat-Juice Co. Front End Paper
Vitmar (Callard) 136

FUNCTIONAL NERVOUS DISORDERS—
Bethlem Royal Hospital, S.E. 1 87
Kenlaw House, Colinsburgh, Fife 86

HEALTH RESORTS *see* "Hydro-therapeutic Establishments, Spas", etc.)

HOMES FOR INVALIDS—
Barnardo's (Dr.) Homes .. .. xlii, 575
Binswanger (Dr.), Sanatorium Bellevue, Kreuzlingen, Switzerland 73
Bishopsbourne Homes for Tuberculosis, Broadstairs and Sturry 69
Brunton House, Lancaster (Feeble Minded Children) 72
Co-operative Sanatorium, Billericay .. 72
Court, The, Blagdon, near Bristol .. xli
David Lewis Colony, Warford (Epileptic) 72
Goathland Nursing Home, Yorks .. 71
Grey house, Sevenoaks (Farm and Garden School for Backward Girls) 70
Kenlaw House, Colinsburgh, Fife (Functional Nervous Disorders) 86
Lansdown Grove House, Bath 68
Mount Ephraim Nursing Home, Tunbridge Wells xl
New Lodge, Billericay (Epilepsy and Mental) 72
Newlands House, London (Private Mental Hospital) 96
Normansfield, Hampton Wick (Mentally Deficient) 72

Royal Albert Institution, Lancaster (Feeble Minded Children) 72
St. Aubins, Ruthrieston, Aberdeen (Private Nursing and Convalescent Home) .. 78
Stoke Park Colony, Stapleton, Bristol (Mentally Defective Children) 70

HOSPITALS, MEDICAL SCHOOLS—
Brompton Hospital for Consumption and Diseases of the Chest 56
Gordon Hospital for Rectal Diseases .. 54
Guy's Hospital 52
Hospital for Sick Children, W.C. 56
Medical Correspondence College 65
Middlesex Hospital Medical School .. 51
Radium Institute, London 85
Royal College of Surgeons, Edinburgh .. 61
Royal College of Surgeons, Dublin .. 57
Royal Dental Hospital, London 57
Royal (Dick) Veterinary College, Edinburgh 57
Royal Eye Hospital 56
Royal London Ophthalmic Hospital .. 54
Shropshire Orthopaedic Hospital 54
St. John's Skin Hospital, London .. 55
St. Mungo's College, Glasgow 57
St. Thomas's Hospital Medical School .. 53
St. Vincent's Open-Air Hospital and School for Crippled Boys 73
University of Aberdeen 61
—— Bristol 58
—— Durham 59
—— Edinburgh 60
—— Liverpool 61
University Examination Postal Institution 61
Westminster Hospital Medical School .. 55

HOTELS AND BOARDING ESTABLISHMENTS—
Buxton, The Buckingham Boarding Establishment 79
Cheltenham Spa, Montpellier Spa Hotel .. 81
Cliftonville, Palm Bay Hotel 84
Crowborough, Crest Hotel 79
Droitwich, Worcestershire Brine Baths Hotel 82
Falmouth, Falmouth Hotel 81
Llandrindod Wells, Ye Wells Hotel .. 81
Llangammarch Wells, Lake Hotel .. 79
Southport, Prince of Wales Hotel 79
— Royal Hotel 79
Woodhall Spa, The Spa Hotel 79

HYDRO-THERAPEUTIC ESTABLISHMENTS, BATHS, SPAS, HEALTH RESORTS, MEDICAL ELECTRICITY, RADIANT HEAT, RADIUM, Etc.—
Bath Spa xxxvi
— Lansdown Grove House 68
Birmingham, City Hydropathic and Massage Establishment 80
Blarney, Co. Cork, St. Ann's Hill Hydro .. 85
British Association for the Advancement of Radiology and Physiotherapy .. iii
British Spa Federation .. .. xxxvi-xl
Buxton Spa xxxvi
Cheltenham Spa xxxvii
Droitwich Brine Baths Spa .. xxxvii
Edinburgh, Medical Baths xxvi
Harrogate Spa xxxviii
Ilkley, Craiglands Hydro 82
Leamington Spa xxxviii
Llandrindod Wells Spa xxxix
Llangammarch Wells 79
London, Dowsing Radiant Heat and Light Treatment 85
— Radium Institute 85
Matlock, Smedley's Hydro 83
New Zealand Spas xl

PAGE
HYDROS, ETC.—*continued.*
Peebles .. 80
— Hotel Hydro .. 81
Southport, Kenworthy's Hydro .. 79
— Smedley Hydro .. 80
Woodhall Spa .. xxxix

ILLUSTRATIONS—
Art Reproduction Co. Ltd. .. 13
Swain, John & Son Ltd. .. 12

INCOME TAX ADVICE—
Hardy & Hardy .. 571

INEBRIATES (HOMES FOR)—
Ashford, near Staines .. 77
Dalrymple House, Rickmansworth .. 77
Tiree Island, West Highlands of Scotland (Farmhouse) .. 78
Norwood Sanatorium, Beckenham Park .. 78
Temple Lodge, Torquay .. 77

INTERESTS (REVERSIONARY)—
Law Reversionary Interest Society Ltd. .. 61

LABORATORIES—
Laboratories of Pathology and Public Health, London .. 62

LIBRARIES (MEDICAL AND SCIENTIFIC)—
Lewis, H. K. & Co. Ltd. .. 22

LIFE ASSURANCE ADVICE—
Tidswell, Ernest, M.A., F.F.I. .. 6

MASSAGE, EXERCISES, Etc.
Associated Male Nurses and Masseurs, London .. 67
Chartered Society of Massage and Medical Gymnastics, W.1 .. 66
City Hydropathic and Massage Establishment, Birmingham .. 80

MEDICAL AGENTS AND SOCIETIES—
British Association for the Advancement of Radiology and Physiotherapy (Incorporated) .. iii
London & Counties Medical Protection Society Ltd. .. 63
Medical Defence Union Ltd. .. 62

MENTAL INSTITUTIONS, HOSPITALS, AND HOMES—
Ashwood House, Kingswinford .. 98
Bailbrook House, Bath .. 97
Barnsley Hall, Bromsgrove .. 102
Barnwood House, Gloucester .. 99
Bethlem Royal Hospital, S.E. .. 87
Binswanger (Dr.), Sanatorium Bellevue, Kreuzlingen, Switzerland .. 73
Bootham Park, York .. 86
Boreatton Park, Baschurch .. 90
Brunton House, Lancaster .. 72
Bryn-y-neuadd Hall, Llanfairfechan .. 91
Bucks Mental Hospital, Stone, Aylesbury .. 98
Camberwell House, S.E. .. 86
Cheadle Royal, Cheadle, Cheshire .. 93
Clarence Lodge, Clapham Park, S.W. .. 102
Co-operative Sanatorium, Billericay .. 72
Coppice, The, Nottingham .. 92
Derby Mental Hospital, Derby .. 96
East Sussex County Mental Hospital .. 102
Exeter Mental Hospital .. 96
Fiddington House, Market Lavington .. 100
Grange, The, Rotherham .. 96
Hampstead, Glasnevin, and Highfield, Drumcondra, Dublin .. 95
Haydock Lodge, Newton-le-Willows .. 89
Holloway Sanatorium, Virginia Water .. 90
Kingsdown House, Box, near Bath .. 91

PAGE
Laverstock House, near Salisbury .. 97
Lawn, The, Lincoln .. 93
London County Mental Hospital, Claybury .. 101
Millfield, York .. 100
Moulton Park, Northampton .. 91
New Saughton Hall, Polton, N.B. .. 92
Newlands House, London .. 96
Normansfield, Hampton Wick .. 72
Northumberland House, N. .. 88
Northwoods House, Winterbourne .. 98
Otto House, West Kensington, W. .. 102
Peckham House, Peckham, S.E. .. 101
Pleasaunce, The, York .. 91
Plympton House, South Devon .. 99
Portsmouth Corporation Mental Hospital .. 95
Retreat, near Armagh .. 86
Retreat, York .. 100
Royal Albert Institution, Lancaster .. 72
Shaftesbury House, Formby-by-Sea .. 99
Silver Birches, Epsom .. 102
Springfield House, near Bedford .. 97
St. Andrew's Hospital, Northampton .. 91
St. George's Retreat, Burgess Hill .. 101
St. Luke's Hospital, W.1 .. 66
St. Patrick's Hospital, Dublin .. 88
Stoke Park Colony, Bristol (Children) .. 70
Stretton House, Church Stretton .. 95
Throxenby Hall, near Scarborough .. 100
Warneford, The, Oxford .. 93
West Sussex County Mental Hospital .. 101
Wye House Asylum, Buxton .. 102

MICROSCOPES AND SCIENTIFIC APPARATUS—
Millikin & Lawley .. 126
Rudolph (O. C.) & Beesley .. 127

MINERAL WATERS, Etc.—
Camwal Ltd., 'Aquaperia' Water .. 143
Ingram & Royle Ltd., 'Vichy-Célestins' 577, 582

MOTOR CARS AND ACCESSORIES—
Bianchi Motors Ltd. .. 587
Henly & Co., Cars .. 105
Reliance Lubricating Oil Co. Ltd., Oils .. 139
Standard Motor Co. Ltd., Cars .. 105

NURSES' INSTITUTIONS—
Cavendish Temperance Male Nurses' Corporation Ltd. .. 71
Hyde Park Nursing Association, W.2 .. 68
Lansdown Grove House, Bath .. 68
Liverpool Male and Female Nurses' Institution .. 78
Male Nurses' Association, London .. 67
New Mental Nurses' Co-operation, London .. 70
Norfolk and Norwich Staff of Nurses Ltd. .. 69
Norfolk Square Nursing Association, London .. 68
Nurses' Association, London .. 67
Nursing Sisters' Institution .. 71
Retreat, York (Mental Nurses) .. 100
St. Luke's Hospital, W.1 .. 66

OPTICIANS (DISPENSING & MANUFACTURING)—
Bruce, Green & Co. Ltd. .. 122
Crookes' (Sir William) Ultimate Anti-Glare Glass Co. Ltd. .. 123
Seur, C. A., M.P.S., F.S.M.C. (Lond.), F.I.O. (Visual Defects and Sight-Testing) .. 127
Spiller, George, Ltd. .. xv, 576

ORGANOTHERAPEUTICAL PRODUCTS—
The British Organotherapy Co. Ltd. .. xxxiii

PRINTERS—
Palatine Press .. 7
Wright, John & Sons Ltd. .. 12

PAGE

PUBLISHERS—(*see also* Index to Books and Periodicals, page 593)
- Adlard & Son & West Newman Ltd. xxxiv
- Arnold, Edward & Co. 16, 33
- Arrowsmith, J. W. Ltd. 50
- Baillière, Tindall & Cox 16, 18, 19, 21, 15, 19
- Bale, J., Sons & Danielsson Ltd. 19, 26
- Black, A. & C. Ltd. 27
- Burrow, Ed. J. & Co. Ltd. 28
- Cassell & Co. Ltd. 20
- Churchill, J. & A. 24, 25
- Frowde, H., Hodder & Stoughton .. 18
- Graham & Heslip xxxiv
- Heinemann, Wm. (Medical Books) Ltd. 31
- Hilton & Co. 33
- Homœopathic Publishing Co. 19
- Kruseman, J. Philip, Medical Art Calendar 588
- Lewis, H. K. & Co. Ltd. 16, 18, 22, 23
- Littlebury Bros. 16
- Livingstone, E. & S. 29
- Longmans, Green & Co. 18
- Macmillan & Co. Ltd. 33
- McQueen, J., Account Books, etc. .. 17
- Medical Publishing Co. Ltd. 18
- Museum Galleries, Portraits 592
- Oliver & Boyd xxxv
- Oxford Medical Publications 16
- Pitman, Sir Isaac & Sons Ltd. 32
- Prescriber Offices 14
- Pulman, Geo. & Sons Ltd. 16
- Putnam's, G. P., Sons Ltd. 17
- Thacker, W. & Co. (Thacker, Spink & Co.) 30
- Wright, John & Sons Ltd. xxvi, xxviii, xxxiv, xxxv, 12, 31 42, 17, 65, 73, 101, 125

SANATORIA FOR TUBERCULOSIS—
- Bishopsbourne Homes for Tuberculosis, Broadstairs and Sturry 69
- Frimley Sanatorium 56
- Goathland Nursing Home, Yorks.. .. 71
- Grampian Sanatorium, Kingussie .. 76
- Home Sanatorium, West Southbourne .. 74
- Leysin Sanatoria, Switzerland 74
- Mendip Hills Sanatorium 76
- Pendyffryn Hall Sanatorium, Penmaenmawr 75
- Royal National Hospital for Consumption and Diseases of the Chest, Ventnor .. 76
- St. Vincent's Open-Air Hospital and School for Crippled Boys, Pinner 73
- Vale of Clwyd Sanatorium, Ruthin .. 73
- Wensleydale Sanatorium, Aysgarth .. 71

SANATORIA SHELTERS, TENTS, Etc.—
- Beattie, G. W. 104
- Hobson, J. T. & Co. 120

SILVER-PLATING—
- Dunsheath, H. & Co. xx

SPAS, HEALTH RESORTS, Etc.—
- (*see* "Hydro-Therapeutic Establishments", etc.)

STAMMERING—
- Behnke, Miss 12
- Schnelle, A. C. 69

STATIONERS—
- Palatine Press 7

STEAMSHIP LINES—
- Bibby Line Mail Steamers 7
- Wilson (Elsmore) & Co. xi

SURGEONS' APPOINTMENTS—
- Bibby Line Mail Steamers 7

SURGICAL INSTRUMENTS AND APPLIANCES, BANDAGES, Etc.—
- Alexander & Fowler 116
- Anderson & Whitelaw Ltd. 105
- Ash, Claudius, Sons & Co. Ltd., Dental Appliances 129
- Associated Surgical Appliance Makers Ltd. 105
- Bailey, W. H. & Son, Surgical Appliances 125
- Braid, A. E. & Co. Ltd. xiv
- Critchley, J. & Sons, Splints 118
- Curtis, H. E. & Son Ltd. 117
- Dental Manufacturing Co. Ltd., Dental Appliances 124
- Domen Belts Co. Ltd. xvi
- Down Bros. Ltd. 107, 108, 109
- Dowsing Radiant Heat Co. Ltd. 85
- Dunsheath, H. & Co., Silver Plating .. xx
- Gardner, J. & Son 120
- Genito-Urinary Mfg. Co. Ltd. 114
- Grossmith, W. R., Artificial Limbs .. 103
- Grout & Co. Ltd., Bandages xx
- Halford, Wm., Senr., Artificial Eyes .. 122
- Harris, Philip & Co. (1913) Ltd. .. 106
- Haywood, J. H. Ltd., Appliances .. 118
- Holborn Surgical Instrument Co. Ltd. .. 112
- Holland & Son, Instep Arch Socks .. xx
- Holman, W., Douching Apparatus .. 127
- Hoskins & Sewell Ltd., Hospital Beds .. xliii
- Isaacs, I. & Co., Bottles, etc. 120
- Jessop, H., Bottles, Dressings, etc. .. 104
- Kenney Limb Co. Ltd. 119
- Mayer & Phelps 113
- Menley & James Ltd., Electric Lamp .. 1
- Millikin & Lawley 126
- Montague, J. H. 122
- Reynolds & Branson Ltd. xvii
- Robinson & Sons Ltd., Gamgee Tissue .. 121
- Rudolph (O. C.) & Beesley 127
- Salmon Ody Ltd., Trusses 126
- Salt & Son Ltd. 594
- Schaerer, Ste. Ame., Maison M. 115
- Sumner, R. & Co. Ltd. Front End Paper and iv to x
- Surgical Manufacturing Co. Ltd. xviii, xix
- Symes & Co. Ltd., Inhaler 142
- Tintometer Ltd. 123
- Weiss, John & Son Ltd. 124
- Young, Archd. & Son 126

TEAS—
- Lynwood's Ltd. xxii

THERMOMETERS—
- Zeal, G. H. Ltd. xiii

TOURS—
- Wilson (Elsmore) & Co. xl

TRANSLATIONS—
- Erwin, The Misses 12

TYPEWRITING AND DUPLICATING—
- Erwin, The Misses 12

VACCINE LYMPH—
- Drug & Chemical Corporation Ltd. .. xxxii
- Sumner, R. & Co. Ltd. vii
- Young, Archd. & Son (Dr. Doucet's) .. 110

X-RAY APPARATUS—
- British Thomson-Houston Co. Ltd. .. xi
- Dean, A. E. & Co. xii
- Medical Supply Association Ltd. 110, 111
- Mottershead & Co. xiii
- Rogers Electric Sales Co. (Great Britain) ii
- Schaerer, Ste. Ame., Maison M. 115

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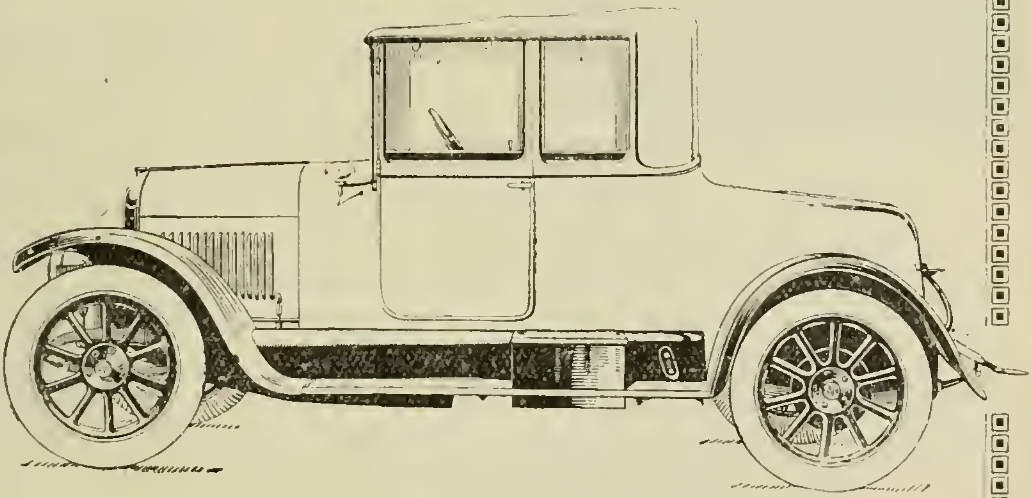

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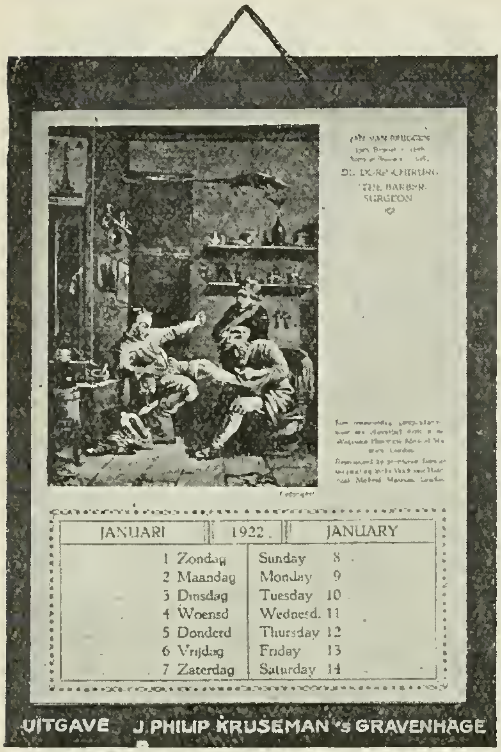

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Alphabetical Index to Advertisers

PAGE
Adlard & Son and West Newman Ltd., Publishers xxxiv
Alexander & Fowler, Surgical Appliances .. 116
Allen & Hanburys Ltd., Chemists 131
Alliance Drug & Chemical Co. 132
Anderson & Whitelaw Ltd., Surgical Appliances 103
Arnold, Edward & Co., Publishers.. 16, 33
Arrowsmith, J. W. Ltd., Publishers.. .. 50
Art Reproduction Co. Ltd., Medical Illustrations 13
Ash, C., Sons & Co. Ltd., Dental Appliances 129
Ashford, near Staines, Inebriate Home .. 77
Ashwood House, Kingswinford, Mental Home 98
Associated Surgical Appliance Makers Ltd.. 103
Australian Mutual Provident Society .. 11

Bailbrook House, Bath, Mental 97
Bailey, W. H. & Son, Surgical Appliances .. 125
Baillière, Tindall & Cox 16, 18, 19, 21, 45, 49
Bale, J., Sons & Danielsson Ltd., Publishers 19, 26
Barnardo's (Dr.) Homes .. .. xlii, 575
Barnsley Hall Mental Home, Bromsgrove .. 102
Barnwood House, Gloucester, Mental .. 99
Bath Spa xxxvi
Beattie, G. W., Venetian Shelters, etc. .. 104
Behnke, Miss, Speech Defects 12
Bell's United Asbestos Co. Ltd., Decolite Flooring 115
Bengué (Dr.) & Co., Chemists 133
Bethlem Royal Hospital, Mental 87
Bianchi Motors Ltd., Motor Cars 587
Bibby Line Mail Steamers 7
Binswanger (Dr.), Sanatorium Bellevue, Kreuzlingen 73
Bishopsbourne Homes for Tuberculosis, Broadstairs and Sturry 69
Black, A. & C. Ltd., Publishers 27
Bootham Park, York, Mental Hospital .. 86
Boreatton Park, Baschurch, Mental Home.. 90
Braid, A. E. & Co. Ltd., Surgical Appliances xiv
Brand & Co. Ltd., Beef Essence, etc. .. xxv
Bristol Medico-Chirurgical Journal 50
Britannic Assurance Co. Ltd. 8
British Association for the Advancement of Radiology and Physiotherapy (Incorporated) iii
British Colloids Ltd., Chemists xxix
British Organotherapy Co. Ltd. xxxiii
British Spa Federation .. .. xxxvi–xl
British Thomson-Houston Co. Ltd., X-ray Tubes xi
Brompton Hospital for Consumption and Diseases of the Chest 56
Brown, Gore & Co., Brandies xxiv
Bruce, Green & Co. Ltd., Opticians.. .. 122
Brunton House, Lancaster (Feeble Minded) 72
Bryce, Wm., Medical Bookseller 14
Bryn-y-neuadd Hall, Llanfairfechan, Mental 91
Buckingham Boarding Establishment, Buxton 79
Bucks Mental Hospital, Stone 98
Burrow, Ed. J. & Co. Ltd., Publishers .. 28
Buxton Spa xxxvi

Cadbury's Bournville Cocoa 113
Callard & Co., Diabetic Foods, etc... .. 136
PAGE
Camberwell House, S.E., Mental Home .. 86
Camwal Ltd., 'Aquaperia' Water 143
Cassell & Co. Ltd., Publishers 20
Cavendish Temperance Male Nurses' Corporation Ltd. 71
Chartered Society of Massage and Medical Gymnastics, London 66
Cheadle, Royal, Cheadle, Cheshire, Mental Hospital 93
Cheltenham Spa xxxvii
Churchill, J. & A., Publishers .. 24, 25
City Hydropathic and Massage Establishment, Birmingham 80
Clarence Lodge, Clapham Park, S.W., Mental 102
Clayton Aniline Co. Ltd., Chemists 130
Colthurst House School for Epileptic Boys, Warford 72
Co-operative Insurance Society Ltd. .. 10
Co-operative Sanatorium, Billericay, Epilepsy and Mental 72
Coppice, The, Nottingham, Mental Hospital 92
Court, The, Blagdon, Nursing Home .. xli
Craiglands Hydro., Ilkley 82
Crest Hotel, Crowborough 79
Critchley, J. & Sons, Artificial Limbs .. 118
Crookes' (Sir William) Ultimate Anti-Glare Glass Co. Ltd., Opticians 123
Crookes' Laboratories, Chemists xxix
Curtis, H. E. & Son Ltd., Surgical Appliances 117

Dalrymple House, Rickmansworth, Inebriate Home 77
David Lewis Colony, Warford (Epileptic) .. 72
Dean, A. E. & Co., X-Ray Apparatus .. xii
Deighton, Bell & Co. Ltd., Booksellers .. 15
Dental Manufacturing Co. Ltd. 121
Derby Mental Hospital, Derby 96
Domen Belts Co. Ltd... xvi
Down Bros. Ltd., Surgical Instruments 107, 108, 109
Dowsing Radiant Heat and Light Treatment 85
Drug & Chemical Corporation Ltd... ..xxxii
Droitwich Brine Baths Spa xxxvii
Dublin Journal of Medical Science 41
Duncan, Flockhart & Co., Chemists.. ..xxviii
Dunsheath, H. & Co., Silver Plating.. .. xx

Eagle Star & British Dominions Insurance Co. Ltd. 9
East Sussex County Mental Hospital .. 102
Edinburgh Medical Baths xxvi
Equity and Law Life Assurance Society .. 64
Erwin, The Misses, Typewriting, etc. .. 12
Exeter Mental Hospital 96

Falmouth Hotel, Falmouth 81
Fellows Medical Mfg. Co., Inc. xxviii
Ferris & Co. Ltd., Chemists Back End Papers and 128
Fiddington House, Market Lavington, Mental Home 100
Fletcher, Fletcher & Co. Ltd., Endolytic Tubes for Urine Testing.. 121
Foyle, W. & G. Ltd., Booksellers 18
Frimley Sanatorium 56
Frowde, H., Hodder & Stoughton, Publishers 18

PAGE
Galloway, James, Bookseller 15
Gardner, J. & Son, Surgical Instruments .. 120
Gautier Frères' Brandies xxiv
General Life Assurance Co. 10
Genito-Urinary Mfg. Co. Ltd., Surgical Instruments 114
Gibbs, D. & W. Ltd., Dentifrice 141
Giles, Schacht & Co., Chemists .. xlviii, 578
Goathland Nursing Home, Yorks 71
Gordon Hospital for Rectal Diseases .. 54
Graham & Heslip, Publishers .. xxxiv
Grampian Sanatorium, Kingussie 76
Grange, The, Rotherham, Mental Home .. 96
Grey House, Sevenoaks, Farm and Garden School for Backward Girls 70
Grossmith, W. R., Artificial Limbs 103
Grout & Co. Ltd., "Norvic" Crêpe Bandages xx
Guy's Hospital, London 52

Halford, Wm. Senr., Artificial Eyes 122
Hampstead, Glasnevin, and Highfield Drumcondra, Dublin, Private Asylums .. 95
Hardy & Hardy, Income Tax Experts .. 574
Harkness, Beaumont & Co., Chemists .. 140
Harris, Philip & Co. (1913) Ltd., Surgical Appliances 106
Harrogate Spa xxxviii
Haydock Lodge, Newton-le-Willows, Mental Hospital 89
Haywood, J. H. Ltd., Surgical Appliances.. 118
Heinemann, Wm. (Medical Books) Ltd. .. 31
Henly & Co., Motor Car Agents 105
Hewlett, C. J. & Son Ltd., Chemists.. .. 138
Hilton & Co., Publishers 33
Hobson, J. T. & Co., Revolving Shelters .. 120
Hoffmann-La Roche Chemical Works Ltd. xxx, xxxi
Holborn Surgical Instrument Co. Ltd. .. 112
Holland & Son, Instep Arch Socks .. xx
Holloway Sanatorium, Virginia Water, Mental Hospital 90
Holman, W., Douching Apparatus 127
Home Sanatorium, West Southbourne .. 74
Homœopathic Publishing Co. 19
Homœopathic World 19
Hoskins & Sewell Ltd., Hospital Beds xliii
Hospital for Consumption and Diseases of the Chest, Brompton 56
Hospital for Sick Children, London, W.C... 56
Hospital and Health Review, The 46
Hugon & Co. Ltd., "Atora" Suet xxvii
Hyde Park Nursing Association, W.2 .. 68

Indian Medical Gazette .. *Thacker* 30
Ingram & Royle Ltd., Mineral Waters 577, 582
Isaacs, I. & Co., Dispensing Bottles, etc. .. 120

Jessop, H., Dispensing Bottles, Corks, Dressings, etc. 104

Kenlaw House, Colinsburgh, Functional Nervous Disorders 86
Kenney Limb Co. Ltd. 119
Kenworthy's Hydro, Southport 79
Kerol Ltd., Disinfectants and Antiseptics xlv
Kingsdown House, Box, near Bath, Mental 94
Kolynos Incorporated, Dental Cream .. 129
Kond's Cocoa 140
Kruseman, J. Philip, Medical Art Calendar.. 588

Laboratories of Pathology and Public Health, London 62
Lake Hotel, Llangammarch Wells 79
Lancet, The 43
Lansdown Grove House, Bath, Nursing Home 68
Laverstock House, Salisbury, Mental .. 97
Law Reversionary Interest Society Ltd. .. 64
Lawn, The, Lincoln, Mental Hospital .. 93
Leamington Spa xxxviii

PAGE
Lewis, H. K. & Co. Ltd., Publishers and Medical Library 16, 18, 22, 23
Leysin Sanatoria, Switzerland 74
Littlebury Bros., Publishers 16
Livingstone, E. & S., Publishers 29
Llandrindod Wells Spa xxxix
Llangammarch Wells, Lake Hotel 79
London County Mental Hospital, Claybury 101
London Filter & Pump Co. Ltd. xliv
London & Counties Medical Protection Society Ltd. 63
Longmans, Green & Co., Publishers.. .. 18
Lynwood's Ltd., Teas xxii

Macmillan & Co. Ltd., Publishers 33
McQueen, J., Medical Account Books, Charts, etc. 17
Male & Female Nurses' Institution, Liverpool 78
Male Nurses' Association, London 67
May, Roberts & Co. Ltd., Chemists xxii, 110
Mayer & Phelps, Surgical Instruments .. 113
Medical Correspondence College 65
Medical Defence Union Ltd... 62
Medical Officer, The 18
Medical Press and Circular 45
Medical Publishing Co. Ltd. 18
Medical Record (American) *Livingstone* 29
Medical Sickness Annuity and Life Assurance Society Ltd. 10
Medical Supply Association Ltd., Electro-Medical Apparatus 110, 111
Mendip Hills Sanatorium 76
Menley & James Ltd., Chemists 1
Middlesex Hospital Medical School 51
Midgley, Charles Ltd., Soaps.. 135
Millfield, York, Mental 100
Millikin & Lawley, Surgical Instruments .. 126
Montague, J. H., Surgical Instruments .. 122
Montpellier Spa Hotel, Cheltenham Spa .. 84
Mottershead & Co., X-ray and Electro-Medical Apparatus xiii
Moulton Park, Northampton, Mental Home 91
Mount Ephraim Nursing Home, Tunbridge Wells xl
Museum Galleries, Famous Portraits .. 592

Neurology and Psychopathology, Journal of.. 47
New Lodge, Billericay (Epilepsy and Mental) 72
New Mental Nurses' Co-operation, London.. 70
New Saughton Hall, Polton, N.B., Mental 92
New Zealand Spas xl
Newlands House, Tooting Bec Common, S.W.17, Mental Hospital.. 96
Norfolk and Norwich Staff of Nurses Ltd. .. 69
Norfolk Square Nursing Association, London 68
Normansfield, Hampton Wick (Mentally Deficient) 72
Northumberland House, N., Mental Home.. 88
Northwoods House, Winterbourne, Mental.. 98
Norwood Sanatorium, Beckenham Park .. 78
Nurses' Association, London.. 67
Nursing Sisters' Institution, S.W.5 71

Oliver & Boyd, Publishers xxxv
Oppenheimer, Son & Co. Ltd., Chemists xxiii
Otto House, West Kensington, W., Mental 102
Oxford Medical Publications 16
Oxo Ltd., Fluid Beef Extracts xlvi

Palatine Press, Printers and Stationers .. 7
Palm Bay Hotel, Cliftonville, Margate .. 84
Parke, Davis & Co., Chemists xxi
Pearson, E. T. & Co. Ltd., Chemists.. .. 581
Peat Products (Sphagnol) Ltd. .. xxiii
Peckham House, Peckham, S.E., Mental .. 101
Peebles as a Health Resort 80
Peebles Hotel Hydro, Peebles 81
Pendyffryn Hall Sanatorium, Penmaenmawr 75
Phillips, Chas. H., Chemical Co. 139
Pitman, Sir Isaac & Sons Ltd., Publishers .. 32

PAGE

Pleasaunce, The, York, Mental Home .. 94
Plympton House, South Devon, Mental .. 99
Portsmouth Corporation Mental Hospital .. 95
Prescriber, The 14
Prince of Wales Hotel, Southport 79
Prudential Assurance Co. Ltd. 11
Pulman, Geo. & Sons Ltd., Publishers .. 16
Putnam's, G. P. Sons' Ltd., Publishers .. 17

Radiology and Electrotherapy, Archives of .. iii
Radium Institute, London 85
Rattray, A. Dewar, Whisky .. xxvii
Reliance Lubricating Oil Co. Ltd. 139
Retreat, near Armagh, Mental Home .. 86
Retreat, York, Mental Hospital 100
Reynolds & Branson Ltd., Chemists, and Surgical Instruments xvii
Rigollot's Mustard Leaves xxii
Robinson & Sons Ltd., Gamgee Tissue .. 121
Rogers Electric Sales Co. (Great Britain), High Frequency Apparatus ii
Royal Albert Institution, Lancaster (Feeble-Minded Children) 72
Royal College of Surgeons, Dublin 57
Royal College of Surgeons, Edinburgh .. 61
Royal Dental Hospital, London 57
Royal (Dick) Veterinary College, Edinburgh 57
Royal Eye Hospital, S.E.1 56
Royal Hotel, Southport 79
Royal London Ophthalmic Hospital 54
Royal National Hospital for Consumption and Diseases of the Chest, Ventnor .. 76
Royal School for the Indigent Blind, Leatherhead xli
Rudolph (O. C.) & Beesley, Microscopes and Instruments 127

Salamon & Co. Ltd., Chemists 142
Salmon Ody Ltd., Trusses 126
Salt & Son Ltd., Surgical Appliances .. 594
Schaerer, Ste. Ane., Maison M., Electro-Medical and Surgical Instruments .. 115
Schnelle, A. C. (Stammering) 69
Scurr, C. A., M.P.S., F.S.M.C. (Lond.), F.I.O., Correspondence Course in Visual Defects and Sight-Testing 127
Shaftesbury House, Formby-by-Sea, Mental 99
Shropshire Orthopaedic Hospital 54
Silver Birches, Epsom, Mental Home .. 102
Smedley Hydro, Southport 80
Smedley's Hydro, Matlock 83
S. P. Charges Co., Sulphaqua 112
Spa Hotel, Woodhall Spa 79
Spiller, George, Ltd., Opticians .. xv, 576
Springfield House, near Bedford, Mental Home 97
St. Andrew's Hospital, Northampton, Mental 91
St. Ann's Hill Hydropathic, Blarney .. 85
St. Aubins Private Nursing Home, Ruthrieston, Aberdeen 78
St. George's Retreat, Burgess Hill, Mental .. 101
St. John's Skin Hospital, London 55
St. Luke's Hospital, London, Mental Nurses 66
St. Mungo's College, Glasgow 57
St. Patrick's Mental Hospital, Dublin .. 88
St. Thomas's Hospital Medical School .. 53

PAGE

St. Vincent's Open-Air Hospital and School for Crippled Boys, Pinner 73
Standard Motor Co. Ltd., Cars 105
Stoke Park Colony, Stapleton, Bristol (Mentally Defective Children) 70
Stretton House, Church Stretton, Mental .. 95
Sumner, R. & Co. Ltd., Surgical Instruments and Chemists Front End Paper and iv to x
Surgery, British Journal of 42
Surgical Manufacturing Co. Ltd. .. xviii, xix
Swain, John & Son Ltd., Engravers 12
Symes & Co. Ltd., Chemists 142

Tamar Indien Grillon xxii
Temple Lodge, Torquay, Inebriate Home .. 77
Thacker, Spink & Co. (W. Thacker & Co.), Publishers 30
Thin, James, Bookseller xxxiv
Thomson, James B., Treatment for Alcoholic Subjects 78
Throxenby Hall, near Scarborough, Mental 100
Tidswell, Ernest, M.A., F.F.I., Life Assurance Consultant 6
Tintometer Ltd., Diagnostic Apparatus .. 123
Tiree Island, West Highlands, Boarding Facilities for Alcoholic Subjects .. 78
Tuberculosis, British Journal of 49

University of Aberdeen 61
— — Bristol 58
— — Durham 59
— — Edinburgh 60
— — Liverpool 61
University Examination Postal Institution .. 61

Vale of Clwyd Sanatorium, Ruthin 73
Valentine's Meat-Juice Co. Front End Paper
Vichy-Célestins (Waters) 577, 582

Warneford, The, Oxford, Mental Hospital 93
Weiss, John & Son Ltd., Surgical Instruments 124
Wensleydale Sanatorium, Aysgarth 74
Wesleyan and General Assurance Society .. 8
West Sussex County Mental Hospital .. 101
Westminster Hospital Medical School .. 55
Whiffen & Sons Ltd., Chemists 138
Willows, Francis, Butler & Thompson Ltd., Chemists 137
Wilson (Elsmore) & Co., Tours in Holland xl
Wingate (Melson) Ltd., Opticians 123
Woodhall Spa xxxix
Woolley, James, Sons & Co. Ltd., Chemists 137
Worcestershire Brine Baths Hotel, Droitwich 82
Wright, John & Sons Ltd., Publishers xxvi, xxviii, xxxiv, xxxv, 12, 34–42, 47, 65, 73, 104, 125
Wye House Asylum, Buxton 102
Wyleys Ltd., Chemists 134

Ye Wells Hotel, Llandrindod Wells 84
Yorkshire Insurance Co. Ltd. 2
Young, Archd. & Son, Instruments and Vaccine Lymph 126, 140

Zeal, G. H. Ltd., Thermometers xiii

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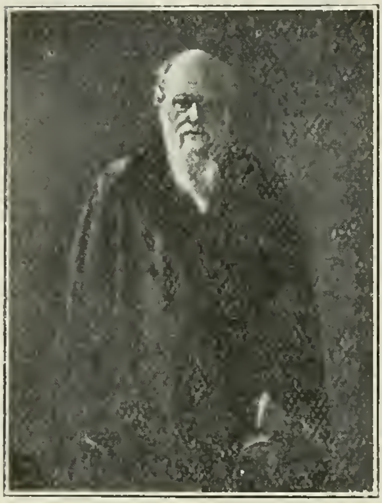

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Index to Books

Advertised in the Present Volume.

PAGE
Abdominal Surgery (CURTIS) *Med. Pub. Co.* 18
Anaesthetics (BUXTON) .. .. *Lewis* 22
Anæsthetics in Practice and Theory (BLOMFIELD) .. .. *Heinemann* 31
Anatomy, Medical Applied (JOHNSON) *Black* 27
Anatomy of the Human Skeleton (FRAZER) *Churchill* 25
Anatomy Principles as seen in the Hand (JONES) .. .. .. *Churchill* 24
Anatomy, Surgical (WHITTAKER) *Livingstone* 29
Anatomy, Surgical Applied (TREVES, KEITH. & MACKENZIE) .. .. *Cassell* 20
Animal Parasites of Man (FANTHAM, STEPHENS, & THEOBALD) .. *Bale* 26
Anthropometry, Laboratory Manual of (WILDER) .. .. *Pitman* 32
Appendicitis (ECCLES) .. .. *Bale* 19
Arthritis Deformans (LLEWELLYN) *Wright* xxvi
Artificial Limbs and Amputation Stumps (LITTLE) .. .. *Lewis* 22

Bacteriology (HEWLETT) .. *Churchill* 25
Bacteriology and Hæmatology, Clinical (EMERY) .. .. *Lewis* 22
Bandaging and Surgical Dressing (Pye's) (COPE) .. .. .. *Wright* xxxv
Biophysics, Introduction to (BURNS) *Churchill* 25
Blood, Clinical Examination of (PAPPENHEIM) *Wright* xxviii
Blood Pictures (PRICE-JONES) *Wright* 40
Blood-vessels, Deep-seated, Surgical Exposure of (FIOLLE & DELMAS) *Heinemann* 31
Bones and Joints, Injuries and Diseases of (BAETJER) .. .. .. *Lewis* 23
Botany, Text-book of (SMALL) *Churchill* 21
Brain and Spinal Cord, Anatomy of (WHITAKER) .. .. *Livingstone* 29
Brain, Mechanism of the, and Function of the Frontal Lobes (BIANCHI) *Livingstone* 29
British Spas and Health Resorts *Burrow* 28

Calendar, Medical Art .. .. *Kruseman* 588
Cataract, Couching for (ELLIOT) .. *Lewis* 16
Cerebrospinal Fever (WORSTER-DROUGHT & KENNEDY) .. .. .. *Black* 27
Certificate Books .. .. *Wright* 12
Charts and Chart Holders .. *Wright* 12
Charts, School and Dental .. *McQueen* 17
Chemical Pharmacology (MCGUIGAN) *Pitman* 32
Chemistry, Manual of (LUFF & CANDY) *Cassell* 20
Chest and Abdomen, Physical Signs in (JEX-BLAKE) .. .. *Churchill* 21
Children, Diseases of (DINGWALL-FORDYCE) *Black* 27
Children, Diseases of (GOODHART & STILL) *Churchill* 25
Children, Diseases of (MYERS) .. *Lewis* 22
Children in India (BIRCH) .. *Thacker* 30
Children, Mentally Deficient (SHUTTLEWORTH & POTTS) .. *Lewis* 23
Children, Sick, Clinical Study and Treatment of (THOMSON, *Oliver & Boyd* xxxv
Children, Surgical Diseases of (PYBUS) *Lewis* 22
Cleft-Palate and Hare Lip (LANE) *Adlard* xxxiv

PAGE
Clinical Guide, Pocket (BURNET) .. *Black* 27
Clinical Methods (HUTCHISON & RAINY) *Cassell* 20
Clinical Methods for Indian Students (BIRDWOOD) .. .. *Thacker* 30
Collectors' Books and Cards .. *Wright* 12
Consumption: Treatment at Home and Rules for Living (CROWE) *Wright* 73
Cranial Surgery (CURTIS) *Med. Pub. Co.* 18

Dairy Bacteriology (ORLA-JENSEN) *Churchill* 24
Deafness, Giddiness, and Noises in the Head (WOAKES) .. .. *Lewis* 18
Deep Therapy, Dosage Tables for (FRIEDRICHVOLTZ) .. *Heinemann* 31
Deformities (TUBBY) .. .. *Macmillan* 33
Diabetes Mellitus, A Clinical Treatise on (LABBE) .. .. .. *Heinemann* 31
Diagnosis, Clinical Surgical (DE QUERVAIN) *Bale* 26
Diagnosis of Main Symptoms, Index of Differential (FRENCH) .. *Wright* 31
Diagnosis, Surgical (GOULD).. *Cassell* 20
Diathermy in Medical and Surgical Practice (SABERTON) .. .. *Cassell* 20
Digestive Organs, Diseases of (AARON) *Lewis* 23
Dispensing Labels .. .. *Wright* 12
Dissections (BRODIE) .. .. *Pitman* 32

Ear, Nose and Throat in Childhood, Diseases of (GUTHRIE) .. .. .. *Black* 27
Electric Ionization (FRIEL) .. *Wright* xxvi
Electrical Treatment (HARRIS) *Cassell* 20
Electricity, Medical (LEWIS JONES) *Lewis* 22
Electrotherapy, History of (COLWELL) *Heinemann* 31
Eye Cases, Care of (ELLIOT) *Oxford Med. Pub.* 16
Eye, Diseases and Injuries of (SYM) *Black* 27
Eye, Swanzy's Handbook (WERNER) *Lewis* 23

'First Aid' to the Injured and Sick (WARWICK & TUNSTALL) .. *Wright* xxxv
'First Aid' Lantern Slides (WARWICK & TUNSTALL) .. *Wright* 125
'First Aid' Wall Charts (IBOTSON) .. *Wright* 101
'First Aid' Wall Diagrams (WARWICK & TUNSTALL) .. *Wright* xxxv
Fowl, Structure of (BRADLEY) .. *Black* 27
Fractures, Modern Methods of Treating (GROVES) .. .. *Wright* 39
Fractures, Operative Treatment of (LANE) *Adlard* xxxiv

Glaucoma (ELLIOT) .. .. .. *Lewis* 16
Gonococcal Infection in the Male (LUMB) *Bale* 26
Gout, Rheumatism and Arthritis, Physiology of (WILDE) 38
Gummata (CURTIS) .. *Med. Pub. Co.* 18
Gymnastics, Medical, and Massage (ARVEDSON) .. .. *Churchill* 21
Gynæcological Surgery (BERKELEY & BONNEY) .. .. .. *Cassell* 20
Gynæcology (EDEN & LOCKYER) *Churchill* 24
Gynæcology, Practitioner's Manual of (MAGIAN) .. .. .. *Heinemann* 31
Gynæcology, Principles of (BELL) *Bailliere* 21

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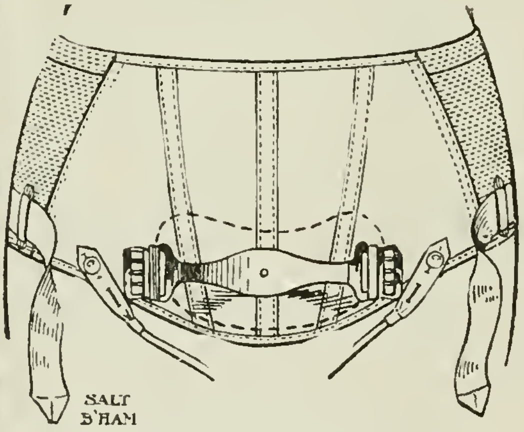

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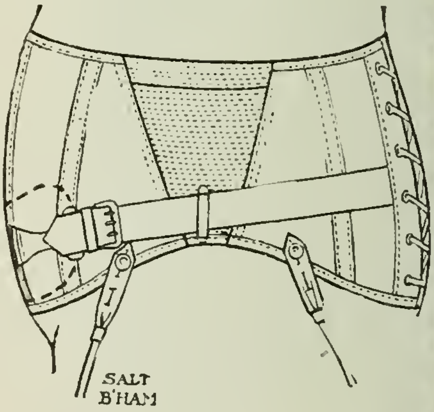

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PAGE
Gynæcology, Student's Handbook (HERMAN & MAXWELL) .. .. *Cassell* 20
Gynæcology, Text-book of (YOUNG) *Black* 27

Health of the Industrial Worker (COLLIS & GREENWOOD) .. .. *Churchill* 24
Health, Laws of, for Schools (MALCOLMSON) *Black* 27
Hernia (ECCLES) .. .. *Baillière* 19
Homœopathic Domestic Medicine (LAURIE) *Homœopathic Publishing Co.* 19
Homœopathic Vade Mecum of Modern Medicine and Surgery (RUDDOCK) *Homœopathic Publishing Co.* 19
Hygiene and Public Health (GHOSH) *Hilton* 33
Hygiene and Public Health (PARKES & KENWOOD) .. .. .. *Lewis* 22
Hypnotic Suggestion (TAPLIN) *Littlebury* 16

Industrial Clinic (COLLIS) .. .. *Bale* 26
Influenza (CROOKSHANK) .. *Heinemann* 31
Influenza and its Pulmonary Complications (KING) .. .. .. *Churchill* 25
Intestinal Protozoa of Man (DOBELL & O'CONNOR) .. .. .. *Bale* 26

Kidneys, Common Infections of (KIDD) *Frowde* 18

Labour, Difficult (HERMAN) .. *Cassell* 20
Liver Abscesses (CURTIS) *Med. Pub. Co.* 18
Lungs and Pleuræ (POWELL & HARTLEY) *Lewis* 23

Malaria at Home and Abroad (JAMES) *Bale* 26
Manic-depressive Insanity and Paranoia (BARCLAY & ROBERTSON) *Livingstone* 29
Married Love (STOPES) .. *Putnam's* 17
Massage (MENNELL) .. .. *Churchill* 24
Massage and Medical Gymnastics (KLEEN) *Churchill* 24
Materia Medica (BRUCE & DILLING) *Cassell* 20
Materia Medica (GHOSH) .. .. *Hilton* 33
Materia Medica (HALE-WHITE) *Churchill* 25
Medical Account Books .. *McQueen* 17
Medical Account Books .. *Wright* 65, 588
Medical Conduct and Practice (ROBERTSON) *Black* 27
Medical Dictionary, Black's (COMRIE) *Black* 27
Medical Dictionary, Illustrated (STEDMAN) *Baillière* 21
Medical History Manuals .. *Black* 27
Medical Jurisprudence (TAYLOR) *Churchill* 25
Medical Jurisprudence for India (LYONS) *Thacker* 30
Medical Jurisprudence and Toxicology (GLAISTER) .. .. *Livingstone* 29
Medical Jurisprudence and Toxicology (ROBERTSON) .. .. .. *Black* 27
Medical Treatment (YEO) .. *Cassell* 20
Medicine, Practical (CARTER) .. *Lewis* 23
Medicine, Practical, Dictionary of (MORRIS, LANGMEAD, & HOLMES) .. *Cassell* 20
Medicine, Preventive (HEWLETT & NANKIVELL) *Churchill* 25
Medicine, Synopsis of (TIDY) .. *Wright* 37
Micro-Analysis of Powdered Vegetable Drugs (SCHNEIDER) .. .. *Pitman* 32
Microscopy, Critical (COLES).. *Churchill* 24
Microtomist's Vade-Mecum (LEE) *Churchill* 24
Midwifery, Handbook of (BERKELEY) *Cassell* 20
Midwifery in India, Text-book of (DAS) *Thacker* 30
Midwifery, Manual of (JELLETT & MADILL) *Baillière* 21
Midwifery, Synopsis of (BOURNE) .. *Wright* 37
Midwifery, Text-book of (JOHNSTONE) *Black* 27
Mind and its Disorders (STODDART) *Lewis* 22
Motherhood, Radiant (STOPES) *Putnam's* 17
Muscles, Action of (MACKENZIE) .. *Lewis* 23

PAGE
Natural Therapy (LUKE) .. *Wright* xxvi
Nerve Exhaustion (CRAIG) .. *Churchill* 25
Nerve Injuries, Peripheral, of Warfare (PLATT) .. .. .. *Wright* 40
Nervous Diseases, Diagnosis of (STEWART) *Arnold* 33
Nervous Diseases, Text Book of (DANA) *Wright* 40
Nervous Disorders, Functional (CORE) *Wright* 40
Nervous System, Central, Form and Functions of (TILNEY & RILEY) .. *Lewis* 23
Newborn, Diseases of the (VON REUSS) *Bale* 26
Nose and Throat (THOMSON) *Cassell* 20
Nose and Throat (TILLEY) .. .. *Lewis* 22
Nose, Throat, and Ear (SYME) *Livingstone* 29

Obstetric Practice, Difficulties and Emergencies of (BERKELEY & BONNEY) *Churchill* 24
Obstetrics and Gynæcology, Text-book of (KERR, FERGUSON, YOUNG, & HENDRY) *Livingstone* 29
Ophthalmic Operations (MAYNARD) *Livingstone* 29
Ophthalmic Practice (MAYNARD) *Livingstone* 29
Ophthalmology, Medical (MOORE) *Churchill* 25
Organs of Internal Secretion (COBB) *Baillière* 21
Orthopædics, Indispensable (CALOT) *Baillière* 21
Paralyses, Surgery of (TUBBY & JONES) *Macmillan* 33
Parenthood, Control of (STOPES) *Putnam's* 17
Parenthood, Wise (STOPES) .. *Putnam's* 17
Pathogenic Micro-organisms (MACNEAL) *Pitman* 32
Pathology, Developmental (TALBOT) *Livingstone* 29
Pathology, Morbid Anatomy, and Post-mortem Technique (MILLER) .. *Black* 27
Pathology, Surgical (BOWLBY & ANDREWES) *Churchill* 24
Pathology, Text-book of (DELAFIELD & PRUDDEN) .. .. .. *Bale* 26
Pharmacology (CUSHNY) .. *Churchill* 24
Pharmacology and Therapeutics, Text-book of (POULSSON) .. .. *Heinemann* 31
Pharmacopœia, The Extra (MARTINDALE & WESTCOTT) .. .. .. *Lewis* 23
Physical Fitness, Assessment of (DREYER & HANSON) .. ..*Cassell* 20
Physics, Manual of (CANDY) ..*Cassell* 20
Physiology, Human (LUCIANI) *Macmillan* 33
Physiology, Principles of (STARLING) *Churchill* 25
Physiotherapeutics, Manual of (LUKE) *Heinemann* 31
Poisoning, What to do in Cases of (MURRELL) *Lewis* 23
Poisons and Powerful Drugs, Detection of (AUTENRIETH) .. .. *Pitman* 32
Prescriber, Pocket (BURNET) .. *Black* 27
Prescription Books .. .. ..*Wright* 12
Prognosis, Index of, and End-Results of Treatment (SHORT) .. ..*Wright* 36
Public Health Laboratory Work (KENWOOD) *Lewis* 22
Public Health, Manual of (ROBERTSON) *Black* 27
Pulmonary Tuberculosis (BURTON-FANNING) *Cassell* 20
Pulmonary Tuberculosis (FOWLER) *Macmillan* 33
Pulmonary Tuberculosis in General Practice (SUTHERLAND) .. .. ..*Cassell* 20

Radiography, Principles of (CROWTHER) *Churchill* 25
Radiography and Radiotherapeutics (KNOX) *Black* 27
Radiumtherapy (WICKHAM & DEGRAIS) *Cassell* 20
Rheumatoid Arthritis (BANNATYNE) *Wright* xxvi
Rickets (DICK).. .. .. *Heinemann* 31

PAGE

Sclero-corneal Trephining in Glaucoma (ELLIOT) .. .. .. *Pulman* 16
Serums, Vaccines, and Toxins (BOSANQUET & EYRE) .. .. *Cassell* 20
Sex, Causation of, in Man (DAWSON) *Lewis* 23
Sex Problems in Women (MAGIAN) *Heinemann* 31
Skin Diseases (MACLEOD) .. .. *Lewis* 23
Skin Diseases (SIBLEY) .. *Arnold* 16
Small-pox, Diagnosis of (RICKETTS & BYLES) *Cassell* 20
Spleen, The, and Some of its Diseases (MOYNIHAN) .. .. .. *Wright* 39
Squint (WORTH) .. .. *Baillière* 21
Stomach, Surgical Treatment of Non-malignant Affections of (CUMSTON & PATRY) *Heinemann* 31
Stomach and Abdomen from the Physician's Standpoint (RUSSELL) .. *Baillière* 21
Stomach and Duodenum, Surgery of (SHERREN) .. .. *Lewis* 23
Surgery, Handbook of (CHIENE) *Livingstone* 29
Surgery, Introduction to (MORISON) *Wright* 41
Surgery, Operative (CHATTERJI) *Thacker* 30
Surgery, Synopsis of (GROVES) .. *Wright* 37
Surgery, Text-book by Various Authors (GASK & WILSON) .. *Churchill* 25
Surgical Contributions (MORISON) *Wright* 41
Surgical Handicraft, Pye's (CLAYTON-GREENE) .. .. .. *Wright* 41
Surgical Operations, Student's Handbook ((TREVES & HUTCHINSON) .. *Cassell* 20
Syphilis and Venereal Diseases (MARSHALL & FFRENCH) .. .. .. *Baillière* 18
Syphilis, Intensive Treatment of (HAYES) *Baillière* 16
Syphilis in the Male, Lesions of Acquired (WHITE & BROWN) .. .. *Bale* 26

Testis, The Imperfectly Descended (ECCLES) *Baillière* 19
Therapeutic Immunization (ROBERTSON) *Livingstone* 29
Therapeutics, Materia Medica, and Pharmacy (POTTER) .. .. .. *Pitman* 32
Tracheo-bronchoscopy, Text-book of (MANN) *Bale* 26
Treatment, An Index of (HUTCHISON & SHERREN) .. .. *Wright* 35
Tropical Diseases (MANSON) .. *Cassell* 20
Tropical Hygiene (LUKIS & BLACKHAM) *Thacker* 30
Tropical Medicine (CASTELLANI & CHALMERS) *Baillière* 21
Tropical Medicine, Essentials of (MASTERS) *Bale* 26
Tropical Medicine and Hygiene (DANIELS) *Bale* 26
Tropical Medicine, Laboratory Studies in (DANIELS & NEWMAN) .. .. *Bale* 26
Tropical Ophthalmology (ELLIOT) *Oxford Med. Publications* 16
Tuberculin in the Treatment of Pulmonary Tuberculosis, Rational Method of Using (GILLESPIE) .. *Graham & Heslip* xxxiv
Tuberculosis of Bones and Joints in Children (FRASER) .. .. *Black* 27
Tuberculosis, Epidemiology of (BUSHNELL) *Bale* 26
Tumours, Innocent and Malignant (BLAND-SUTTON) .. .. *Cassell* 20

Urethra, Male, Common Diseases of (KIDD) *Longmans* 18
Urinary Analysis and Diagnosis (HEITZMANN) *Baillière* 21
Urinary Surgery (KIDD) .. *Longmans* 18
Urology, Practice of (CHETWOOD) *Baillière* 21

Wives and Mothers in India and the Tropics (STALEY) .. .. *Thacker* 30

X-Rays, General Practice and (KNOX) *Black* 27

Zoology for Medical Students (KERR) *Macmillan* 33
Zoology, Practical (GILCHRIST & VON BONDE) *Livingstone* 29
Zoology, Text-book of (PARKER & HASWELL) *Macmillan* 33

PERIODICALS.

PAGE

American Medical Record .. .. *Livingstone* 29
Archives of Radiology and Electrotherapy iii
Bristol Medico-Chirurgical Journal .. .. *Arrowsmith* 50
British Journal of Surgery .. .. *Wright* 42
British Journal of Tuberculosis .. .. *Baillière* 49
Dublin Journal of Medical Science 41
Homœopathic World .. .. *Homœopathic Publishing Co.* 19
Hospital and Health Review, The .. .. *Scientific Press* 46
Indian Medical Gazette .. .. *Thacker* 30
Lancet, The .. .. *Lancet Offices* 43
Medical Officer, The 48
Medical Press and Circular .. .. *Baillière* 45
Neurology and Psychopathology, Journal of .. .. *Wright* 47
Prescriber, The .. .. *Prescriber Offices* 14

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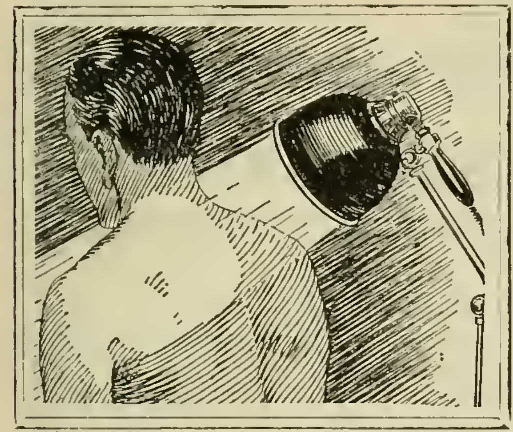

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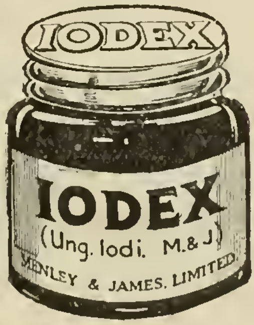
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					£
General Accident Fire and Life Assurance Corporation Ltd., Perth, Scotland. *Gen. Man.*, F. Norie-Miller, J.P. .. P	1885	49/2	64/11	91/3	348,709
General Life Assurance Co., 103, Cannon Street, E.C. 4. *Sec.*, Albert Burton Nye. **Further particulars see page 10** P	1837	49/10	65/4	92/8	1,932,366
Gresham Life Assurance Society Ltd., St. Mildred's House, Poultry, E.C. 2. *Gen. Man. & Sec.*, Alexander Lawson .. P	1848	47/6	62/10	88/6	9,842,577
Guardian Assurance Co. Ltd., 11, Lombard Street, and 21, Fleet St., E.C. *Gen. Man.*, Geo. W. Reynolds. *Act.*, W. P. Cook P	1821	48/10	64/6	89/3	4,557,527
Law Union and Rock Insurance Co. Ltd., 7, Chancery Lane, W.C. *Sec.*, J. Stirling P	1806	48/4	64/-	89/10	8,661,504
†Legal & General Assurance Society Ltd., 10, Fleet St., E.C. *Gen. Man.*, W. A. Workman P	1836	38/9	53/3	77/4	13,635,415
Life Association of Scotland, 82, Princes St., Edinburgh. *Man.*, Gordon Douglas. *Sec.* R. M. M. Roddick. London Office, 28, Bishopsgate, E.C. *Sec.*, G. S. N. Carter, F.I.A.	1838	48/11	64/10	91/1	5,459,462
Liverpool and London and Globe Insurance Co. Ltd., 1, Dale Street, Liverpool. *Gen. Man & Sec.*, Hugh Lewis. London Office, 1, Cornhill, E.C. .. .. . P	1836	49/10	65/9	91/3	5,203,965
London and Scottish Assurance Corporation Ltd., 66–67, Cornhill, E.C. *Gen. Man.*, W. Æneas Mackay. *Sec.*, Louis I. Jarvis. *Jnt. Asst. Secs.*, E. E. Dent and L. C. Kestin. *Act.*, Harold Dougharty .. .. P	1862	48/9	64/9	91/2	4,230,402
London Assurance Corporation, 7, Royal Exchange, E.C. *Man.* of Life Dept., James Clunes. *Act.*, A. G. Hemming .. P	1720	49/-	64/8	90/2	2,947,729
London Life Association, Ltd., 81, King William Street, E.C. *Act. & Man.*, H. M. Trouncer, M.A., F.I.A. .. M	1806	47/-	61/8	85/4	6,470,149
Marine and General Mutual Life Assurance Society, 14, Leadenhall Street, E.C. *Act. & Sec.*, Howard T. Cross, F.I.A. M	1852	48/10	65/-	91/6	2,153,393
Medical Sickness Annuity & Life Assurance Society Ltd., 300, High Holborn, W.C. *Man. & Sec.*, Bertram Sutton, F.C.I.I. **Further particulars see page 10** M	1884	40/2	55/3	80/-	330,000
Metropolitan Life Assurance Society, 13, Moorgate Street, E.C. 2. *Act. & Man.*, H. J. Baker, F.I.A. .. .. .. M	1835	49/9	66/4	92/-	2,312,454
Mutual Life and Citizens' Assurance Co. Ltd. (of Australia), Effingham Ho., 1, Arundel St. W.C. *Man.*, Alex. S. Sellar, M.A., F.F.A. P	1886	48/9	65/3	89/9	11,952,650
Mutual Life Insurance Co. of New York, 7 & 8, Norfolk Street, Strand, W.C. 2. *Gen. Man.*, J. H. Harrison Hogge. *Sec.*, L. A. Mumford M	1843	48/9	66/-	97/-	135,258,194
National Benefit Assurance Co. Ltd., National House, Newgate Street, E.C. *Man.*, J. Francis, O.B.E., J.P. *Sec.*, C. G. Talbot. .. .. .. P	1890	46/4	61/7	87/4	94,010
National Mutual Life Assurance Society, 39, King Street, Cheapside, E.C. *Act. & Man.*, G. Marks, C.B.E., F.I.A. *Asst. Act.*, H. G. Sharp, F.I.A. *Sec.*, G. V. S. Booth. M	1830	48/4	63/7	89/6	3,155,048
National Mutual Life Association of Australasia, Ltd., 5, Cheapside, E.C. *Man.*, H. W. Meyers. M	1869	46/8	61/6	87/2	12,524,368
National Provident Institution, 48, Gracechurch Street, E.C. *Act. & Sec.*, L. F. Hovil, F.I.A. .. .. M	1835	50/2	66/3	91/1	7,573,500
New York Life Insurance Co., Trafalgar Buildings, Trafalgar Square, London, W.C. *Gen. Man.*, E. H. Krause. *Sec.*, Wm. R. Collinson, F.C.I.S. .. .. M	1845	48/9	66/-	96/11	204,476,992

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					£
North British and Mercantile Insurance Co. Ltd. 61, Threadneedle St., E.C. 2. & 64, Princes St., Edinburgh. *Gen. Man.*, London, Sir A. Worley, C.B.E. *Gen. Man.*, Edin., Owen D. Jones .. .. P	1809	49/10	66/1	91/11	18,124,629
Northern Assurance Co. Ltd., 1, Moorgate Street, E.C. *Joint Gen. Managers*, H. Gayford, J. Robertson .. .. P	1836	49/-	64/8	90/10	4,708,385
Norwich Union Life Insurance Society, Norwich. *Gen. Man. & Act.*, Davidson Walker. *Sec.*, M. Mackenzie Lees. London Office, 49, Fleet Street, E.C.4. M	1808	45/8	59/6	85/3	17,532,528
Pearl Assurance Co. Ltd., 252, High Holborn, W.C.1. *Man'g Director*, G. Shrubsall, J.P. P	1864	49/-	65/-	92/-	17,848,965
Phœnix Assurance Co. Ltd., Phœnix House, King William St., E.C. 4. Trafalgar House, Waterloo Place, S.W. 1, & 187, Fleet Street, E.C. 4. *Gen. Man.*, R. Y. Sketch. P	1782	48/11	64/7	90/8	*11,658,054
Provident Mutual Life Assurance Association, 27 & 29, Moorgate Street, E.C. *Man. & Act.*, C. R. V. Coutts .. .. M	1840	51/-	68/-	95/-	3,000,000
Prudential Assurance Co. Ltd. Holborn Bars. *Sec.*, Sir George May, K.B.E. **Further particulars see page 11** P	1848	49/6	65/11	91/11	58,786,311
Refuge Assurance Co. Ltd., Oxford Street, Manchester. *Gen. Mans.*, J. Proctor Green and W. H. Aldcroft. London Office, 133, Strand, W.C. .. .. .. P	1864	49/3	65/9	91/9	19,061,052
Royal Exchange Assurance Corporation, Royal Exchange, E.C., and 44, Pall Mall, S.W. *Act.*, H. E. Nightingale, F.I.A. P	1720	49/-	64/9	90/2	5,052,187
Royal Insurance Co. Ltd., 1, North John St., Liverpool. *Gen. Man.*, J. J. Atkinson. London Offices, 24–28, Lombard Street. *Sec.* to London Board, R. M'Connell P	1845	48/8	64/4	90/4	13,348,515
Scottish Amicable Life Assurance Society, St. Vincent Place, Glasgow. *Gen. Man.*, W Hutton. *Sec. & Act.*, R. Gordon-Smith. London Office, 1, Threadneedle St., E.C. *Sec.* H. Robertson .. .. M	1826	51/9	66/3	90/1	7.104,973
Scottish Equitable Life Assurance Society, 28, St. Andrew Square, Edinburgh. *Gen. Man.*, C. Guthrie. *Sec. & Act.*, J. M. Warden. London Office, 13, Cornhill, E.C. 3. *Sec.*, P. W. Purves. .. .. M	1831	50/-	65/5	90/6	6,476,573
Scottish Life Assurance Co. Ltd., 19, St. Andrew Square, Edinburgh. *Man.*, Lewis P. Orr, F.R.S.E. London Office, 9 & 10, King St., E.C. *Sec.*, L. Campbell P	1881	49/5	64/6	90/5	3,009,[illegible]40
Scottish Provident Institution, 6, St. Andrew Square, Edinburgh. *Man.*, R. T. Boothby. *Joint Secs.*, C. W. Thomson, & A. Graham Donald. *Act.*, W. G. Walton. London Offices, 3, Lombard St. E.C., and 17, Pall Mall, S.W. .. .. M	1837	42/4	56/6	83/2	16,500,000
Scottish Temperance & British General Assurance Co., Ltd., 109, St. Vincent Street, Glasgow. *Manager*, Adam K. Rodger. London, 2, 3 & 4, Cheapside. *Man.*, R. J. Moss. *Less 10 per cent to Abstainers* P	1883	48/6	63/9	89/10	3,136,644
Scottish Union & National Insurance Co., 35, St. Andrew Square, Edinburgh. *Gen. Man.*, J. A. Cook. London Office, 5, Walbrook, E.C. 4. *Sec.*, James G. Nicoll .. P	1824	50/-	65/8	92/-	8,474,238
Scottish Widows' Fund Life Assurance Society, 9, St. Andrew Square, Edinburgh. *Man. & Act.*, G. J. Lidstone. *Sec.*, Geo. C. Stenhouse. London Offices, 28, Cornhill, E.C.3. and 17, Waterloo Place, S.W.1. M	1815	51/9	66/3	90/7	22,520,643

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TITLE, ETC., OF OFFICE.	A	B	C	D	E
					£
Standard Life Assurance Co., 3, George Street, Edinburgh. *Man.*, S. E. Macnaghten. London Offices, 110, Cannon Street, E.C. *Sec.*, A. B. Drayton, and 15a, Pall Mall *Sec.*, E. V. Goodall .. .. P	1825	48/11	64/5	80/-	13,460,000
Sun Life Assurance Society, 63, Threadneedle Street, E.C. *Sec. & Gen. Man.*, E. Linnell. *Act.*, R. G. Salmon, F.I.A. *Assistant Sec.*, G. M. Searle, F.I.A. P	1810	49/2	66/6	94/2	12,720,041
Sun Life Assurance Co. of Canada, Canada House, 4 & 5, Norfolk Street, W.C. *Man.*, J. F. Junkin .. .. .. P	1865	48/5	65/4	94/1	21,256,318
United Kingdom Provident Institution, 196, Strand, W.C. *Sec.*, H. W. Hasler. *Act.*, C. Cosmo Monkhouse, B.A., F.I.A. *Asst. Act.* W. G. Barrett, F.I.A. M	1840	50/3	66/7	92/7	10,187,032
University Life Assurance Society, 25, Pall Mall, S.W.1. *Act. & Sec.*, R. Todhunter, M.A. .. .. .. P	1825	52/4	68/9	94/10	907,681
Wesleyan & General Assurance Society. Life, Annuities, Sickness, Assurance Buildings, Steelhouse Lane, Birmingham. *Gen. Man.*, A. L. Hunt. London Office, Halton House, 20–23, Holborn, E.C. 1. Further particulars see page 8 .. M	1841	48/1	65/8	93/10	3,897,401
Yorkshire Insurance Company, Ltd., Chief Offices: St. Helen's Square, York. Bank Buildings, Princes Street, E.C. *London Branches*, 48, Pall Mall, S.W.1: 49, Sloane Square, S.W.1: 132, Newington Causeway, S.E.1; 6, Norfolk Street, Strand, W.C.2; 43, Broadway, Stratford, E.15; 551, High Road Tottenham, N.17; 280, Euston Road, N.W.1. Further particulars see page 2 .. .. .. P	1824	49/1	64/9	91/7	3,352,305

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Lectures, Clinical Demonstrations, Instruction in Refraction Work, and Instruction in Pathology, &c., are given by the Teaching Staff of the Hospital. Clinical Instruction is given daily in the Out-Patient Department at 2 p.m. There are annually more than 22,000 new patients attending the Hospital, and excellent opportunity is afforded to Practitioners and Medical Students to acquire a practical knowledge of Ophthalmology.

The instruction at the School is recognized by the University of London and the Royal Colleges of Physicians and Surgeons for the purposes of their examinations in Ophthalmology. For further particulars apply to the Dean.

THE HOSPITAL FOR SICK CHILDREN,

GREAT ORMOND STREET, W.C. 1.

Clinical Instruction is given daily by Members of the Visiting Staff in the Wards, Out-patient Department, Operating Theatre and Post-mortem Room.

Clinical Clerkships and Dresserships in the Wards and Clinical Assistantships in the Out-patient Department are also available for Students and Post-Graduates, both men and women. Two months of the time spent as Clerks or Dressers by Undergraduate Students is recognized by the Universities of London, Oxford, Cambridge, etc., and by the conjoint Examination Board of England for their final examinations.

Fees for Hospital Attendances: One Month's Ticket, **£2 2s.** Three Months' Ticket, **£5 5s.** Perpetual Ticket, **£10 10s.**

Special Reduced Fee for Clinical Clerks for one month, **£1 1s.**

Further particulars may be obtained from the Secretary or the Dean.

O. L. ADDISON, F.R.C.S., *Dean to the Medical School.*
WILFRED J. PEARSON, D.M., *Sub-Dean to the Medical School.*

HOSPITAL for CONSUMPTION & DISEASES OF THE CHEST, Brompton

and SANATORIUM at FRIMLEY.

Students and qualified men are admitted to the practice of the Hospital and the lectures on payment of a Fee of One Guinea for One Month; Two Guineas for Three Months. Clinical Assistants to the Out-Patients' Department are appointed for Six Months, and are expected to join the practice of the Hospital for that period. A certificate is given to those who have attended a six months' course with satisfaction. The Hospital practice includes out-patient and in-patient clinics. Demonstrations in the Clinical Laboratory, Museum and Special Departments, and Artificial Pneumothorax.

Full particulars can be obtained from - **L. S. BURRELL,** *Dean.*

Royal College of Surgeons in Ireland

SCHOOLS OF SURGERY.

Winter Session commences in October, and Summer Session in April.

PROFESSORS:—*Anatomy*—EVELYN J. EVATT. *Physiology and Histology*—J. ALFRED SCOTT. *Surgery*—G. J. JOHNSTON. *Chemistry*—WM. CALDWELL. *Physics*—WM. CALDWALL. *Practice of Medicine*—FRANCIS CARMICHAEL PURSER. *Materia Medica, Therapeutics, and Pharmacy*—ROBERT J. ROWLETTE. *Midwifery and Gynæcology*—E. HASTINGS TWEEDY. *Forensic Medicine*—J. W. BIGGER. *Biology, Botany, and Zoology*—E. McDOWEL COSGRAVE. *Ophthalmic and Aural Surgery*—J. B. STORY. *Dentistry*—H. G. SHERLOCK. *Pathology*—WM. BOXWELL.

PRIZES.—The Barker Anatomical Prize, £26 5s. The Carmichael Scholarship, £15. The Mayne Scholarship, £8. The Gold and Silver Medals in Surgery, and the Stoney Memorial Gold Medal in Anatomy.

Class Prizes accompanied by Silver Medals, will also be given in each subject.

Prospectus and Student's Guide can be obtained on application to ALFRED MILLER, O.B.E.

The Registrar, Royal College of Surgeons, Dublin.

ROYAL DENTAL HOSPITAL OF LONDON.

SCHOOL OF DENTAL SURGERY (University of London),

Leicester Square, London, W.C.2.

THIS SCHOOL is thoroughly equipped for Teaching Dental Surgery. The CLINIC of the Hospital is UNRIVALLED.

DENTAL MECHANICS.—Pupils can join in May and October for the two years' Training in Dental Mechanics.

WOMEN are admitted as Students, and are eligible for all appointments and prizes.

For further particulars apply THE DEAN.

ST. MUNGO'S COLLEGE, GLASGOW.

FACULTY OF MEDICINE.

The commodious Medical Buildings of the College are situated within the grounds of the GLASGOW ROYAL INFIRMARY, and in this Hospital, containing (including the OPHTHALMIC DEPARTMENT) over 600 Medical and Surgical beds, the Clinical and Pathology Classes are conducted.

LECTURES AND DEMONSTRATIONS—Elementary Physics—Prof. J. T. BROWN, M.A., B.Sc. Chemistry—Prof. ALEC. B. STEPHEN, B.Sc., F.I C Botany—Prof. JAMES SWANSON, M.A., M B. Zoology—Prof LEONARD A. LUCAS KING, B.A. Senior Anatomy, Junior Anatomy, Osteology, Practical Anatomy—Prof. JAMES BATTERSBY, F.R.C.S. Eng. Physiology—Prof. ARCH. GALBRAITH FAULDS, M.B., C.M., F.R.F.P.S.,G. Surgery—Prof. MILNE MCINTYRE, M.D., F.R.F.P.S.,G. Clinical Surgery—The SURGEONS, Royal Infirm. Practice of Medicine—Prof. JOHN HENDERSON, M D. Clinical Medicine—The PHYSICIANS, Royal Infirmary. Midwifery—Prof. ROBERT JARDINE, M.D. Materia Medica—Prof. T. STEWART BARRIE, M.B. Pathology—PATHOLOGIST to the Royal Infirmary. Ophthalmology—Prof. HENRY G. LEASK, M D., F R.F.P S.,G. Gynæcology—Prof. BALFOUR MARSHALL. Psychological Medicine—Prof. JAMES H. MACDONALD. Forensic Medicine. Public Health Laboratory—Prof. A. ALLISON.

The fees for all the Lectures, Practical Classes and Hospital attendance necessary for candidates for the Diplomas of the English or Scotch Colleges of Physicians and Surgeons amount to about £120

A Syllabus of the Medical Curriculum, giving particulars of the classes, fees, etc., may be had gratis on application to the Dean of the Medical Faculty, 85, Castle Street, Glasgow.

ROYAL (DICK) VETERINARY COLLEGE

EDINBURGH.

PRINCIPAL - O. CHARNOCK BRADLEY, M.D., D.Sc., M.R.C.V.S.

After attendance on complete courses of instruction in this College, Students may proceed to the Examinations for the Diploma of Membership of the Royal College of Veterinary Surgeons (M.R.C.V.S.).

Students of the College may also present themselves for the Degree of Bachelor of Science (B.Sc.) in Veterinary Science conferred by the University of Edinburgh.

A copy of the College Calendar may be obtained on application to I. P. MILLIGAN, W.S., Sec.

UNIVERSITY OF BRISTOL.

FACULTY OF MEDICINE.

THE University affords complete courses of instruction for its own examinations, those of the University of London, and those of the Conjoint Board, etc., for Medical Degrees or Diplomas. The Dental and Public Health Departments afford the necessary instruction for the Degrees and Diplomas of the University and of other examining bodies in those subjects.

The University confers the following Degrees and Diplomas :

Bachelor of Medicine and Bachelor of Surgery	M.B., Ch.B.
Master of Surgery	Ch.M.
Doctor of Medicine	M.D.
Doctor of Philosophy	Ph.D.
Bachelor of Dental Surgery	B.D.S.
Master of Dental Surgery	M.D.S.
Diploma in Dental Surgery	L.D.S.
Diploma in Public Health	D.P.H.

The early part of the curriculum so interlocks with the curriculum for the B.Sc. that the Medical student may without much loss of time take also the degree of B.Sc. Moreover, the Dental student may in seven years take both Dental and Medical degrees. The whole of the Dental Mechanical work for the Bristol Royal Infirmary and the Bristol General Hospital is done in the University laboratory by the students, instructed by skilled mechanics.

CLINICAL WORK is done at the Bristol Royal Infirmary, and the Bristol General Hospital, which together contain 618 beds. The Bristol Royal Hospital for Sick Children and Women, the Bristol Eye Hospital (108 beds), the Bristol City and County Asylum, and the Bristol City Fever Hospital are also open for the clinical instruction of students.

SCHOLARSHIPS.—There is no entrance scholarship, but students from the City of Bristol may, on their merits, receive financial aid from the City Scholarship Fund on application to the City Scholarship Committee.

Several Scholarships and Prizes are open to students during their Hospital career.

HOSPITAL APPOINTMENTS open to students after qualification.

At the Bristol Royal Infirmary.—Two House Surgeons, two House Physicians (of these one is chosen as Senior Resident Officer), one Resident Obstetric Officer, one Throat, Nose and Ear House Surgeon, one Ophthalmic House Surgeon, one Casualty Officer, and one Dental House Surgeon.

At the Bristol General Hospital.—One Senior House Surgeon, one Casualty House Surgeon, two House Physicians, one House Surgeon, and one Dental House Surgeon. All these appointments are salaried, with board and residence.

For further particulars and prospectus apply to the Dean of the Faculty of Medicine.

UNIVERSITY OF DURHAM

COLLEGE OF MEDICINE, NEWCASTLE-ON-TYNE

Degrees in Medicine, Surgery and Hygiene: Diplomas in Public Health and Psychiatry, and Licence in Dental Surgery.—Seven Degrees, two Diplomas, and one Licence are conferred by the University of Durham—*viz.*, the Degrees of Bachelor of Medicine, Bachelor of Surgery, Doctor of Medicine, Master of Surgery, and Doctor of Surgery; Bachelor of Hygiene, and Doctor of Hygiene; the Diplomas in Public Health and Psychiatry, and the Licence in Dental Surgery. These Degrees, etc., are open to Men and Women.

Attendance at the University of Durham College of Medicine during one of the five years of professional study, or subsequently to qualification elsewhere, is required as part of the curriculum for the Degrees, except in the case of Practitioners of more than fifteen years' standing, who, having attained the age of forty years, can obtain the Degree of M.D. after examination only.

The first three Examinations for the Degrees of M.B. and B.S. may be passed prior to the commencement of attendance at Newcastle.

A candidate who has passed the First and Second Examinations of the University will be exempt from the First and Second Examinations of the Conjoint Board in England, and will be entitled to present himself for the Final Examination of the Board on the completion of the necessary curriculum. Students who have satisfied the requirements of the General Medical Council as regards Registration, in some Examination other than the Durham Matriculation, or its equivalent, may enter on a course of study for a degree in Medicine upon satisfying the Examiners of the University of Durham in *three* of the subjects of the Matriculation Examination (exclusive of Religious Instruction and Elementary Mathematics), provided that one of them is a language other than English. In the case of a Student who spends only one year at Newcastle, the necessary subjects of the Matriculation Examination must be passed at least 12 months previously to the candidate's entry for his Final Examination for the Degrees.

Students can complete, at the University of Durham College of Medicine, Newcastle-upon-Tyne, the entire course of professional study required for the above degrees, and for the Diplomas in Public Health and Psychiatry; also for the examinations of the Royal Colleges of Physicians and Surgeons, and for the Army and Navy Examination Boards.

A Dental curriculum is provided, and a Licence in Dental Surgery may be obtained after Examination.

All information is given in the Calendar of the University of Durham College of Medicine, Newcastle-on-Tyne, which may be obtained gratis from the Registrar at the College.

Scholarships, &c.—University of Durham Scholarship, value £100 for proficiency in Arts, awarded annually to full students in their first year only. The Pears Scholarship—value £150—for proficiency in Arts. Dickinson Scholarship—value the interest of £400, and a Gold Medal—for Medicine, Surgery, Midwifery, and Pathology. Tulloch Scholarship—value the interest of £400—for Anatomy, Biology, Chemistry, and Physics. Charlton Scholarship—value the interest of £700—for Medicine. Gibb Scholarship—value the interest of £500—for Pathology. Luke Armstrong Scholarship—interest on £680—for comparative Pathology. Stephen Scott Scholarship—interest on £1000—for Surgery. Heath Scholarship—the interest on £4000 for Surgery, to be awarded every second year. Philipson Scholarships (2)—interest of £1800, to be awarded in connection with the Final M.B., B.S. Examinations in March and June. Gibson Prize—value the interest of £250 Stock—for Midwifery and Diseases of Women and Children. The Turnbull Prize and Medal—for Surface Anatomy. The Outterson Wood Prize—value the interest of £250—for Psychological Medicine. The Goyder Memorial Scholarship (at the Infirmary)—value the interest of £325—for Clinical Medicine and Clinical Surgery. At the end of each Session, a Prize of Books is awarded in each of the regular Classes. Assistant Demonstrators of Anatomy, Prosectors, and Assistant Physiologists are elected yearly. Pathological Assistants, Assistants to the Dental Surgeon, Assistants in the Eye Department, Clinical Clerks and Dressers are appointed every three months.

The Royal Victoria Infirmary contains over 600 beds. Clinical Lectures are delivered by the Physicians and Surgeons in rotation. Pathological Demonstrations are given as opportunity offers, by the Pathologist; Practical Midwifery can be studied at the Newcastle Maternity Hospital, where there is an outdoor practice of over 1000 cases annually.

FEES.

(*a*) A Composition Ticket for Lectures at the College may be obtained—

I.—By payment of £122 on entrance.

II.—By payment of £82 at the commencement of the First Year, and £54 at the commencement of the Second Year.

III.—By three annual instalments of £61 10s., £47 10s., and £41 respectively, at the commencement of the Sessional year.

(*b*) Fees for attendance on Hospital Practice:—

For 3 Months' Medical and Surgical Practice, £12 12s. For 6 months', £15 15s. For 1 year's, £21. For Perpetual, £46; or by two instalments—First year, £26; Second year, £23.

In addition to the above fees, the Committee of the Royal Victoria Infirmary require the payment of 2 guineas yearly up to three years from every Student attending the Infirmary. For six months, or any shorter period, this fee is 1 guinea. After three years of attendance, such payment will be no longer necessary.

(*c*) Single courses of Lectures, £6 16s. 6d.

(*d*) A Composition Ticket for the courses of Lectures and Practical work of the first two years of the curriculum, may be obtained by the payment of £68 on entrance.

(*e*) Composition fee for Lectures, etc., at College for Licence in Dental Surgery, £57 10s. Composition fee for Practical work at Dental Hospital, £60 4s. if paid in one sum; or £62 6s. if paid in two instalments.

(*f*) Composition fee for courses of instruction for the Diploma in Psychiatry, £35.

Fees for Lectures, etc., at the College and for Hospital Practice, must be paid to the Registrar; and fees for Practical Dental Work to the Dean of the Dental Hospital—at the time of entry.

Further particulars may be obtained from the Registrar, PROF. HOWDEN, at the College.

UNIVERSITY OF EDINBURGH.

SESSION 1921-22.

Principal—SIR J. ALFRED EWING, K.C.B., M.A., D.Sc., LL.D., F.R.S.

The WINTER SESSION, 1921-22, opens on 5th October, and closes 17th March.
The SUMMER SESSION, 1922, opens on 2nd May, and closes 14th July.

FACULTY OF MEDICINE.

Dean—PROFESSOR J. LORRAIN SMITH, M.A., M.D., F.R.S.

The Faculty embraces twenty Chairs and fifty-six Lectureships; and attached to these Chairs there are about forty Assistants and Demonstrators. Instruction is given in all the main branches of Medical Science, viz.

PROFESSORS:

Chemistry—George Barger, D.Sc., F.R.S.
Zoology—J. Cossar Ewart, M.D., F.R.S.; J. H. Ashworth, D.Sc., F.R.S.
Botany—Sir Isaac Bayley Balfour, M.D., D.Sc., F.R.S.
Anatomy—Arthur Robinson, M.D., C.M.
Physiology—Sir E. S. Schafer, LL.D., F.R.S.
Materia Medica—A. R. Cushny, M.D., LL.D., F.R.S.
Pathology—J. Lorrain Smith, M.D., F.R.S.
Bacteriology—James Ritchie, M.A., M.D.
Public Health—C. Hunter Stewart, M.B., D.Sc.
Forensic Medicine—Harvey Littlejohn, M.B., B.Sc.
Medicine—Geo. Lovell Gulland, M.D.
Surgery—Alexis Thomson, C.M.G., M.D., C.M., B.Sc.
Midwifery—
Clinical Surgery—Sir H. J. Stiles, M.B., C.M.
Clinical Medicine—F. D. Boyd, C.B., M.D.; Geo. Lovell Gulland, M.D.
Tuberculosis—Sir Robert W. Philip.
Therapeutics—J. C. Meakins, M.D.
Psychiatry—G. M. Robertson, M.D.

UNIVERSITY LECTURERS:

Clinical Surgery—Alexis Thomson, C.M.G., M.D., C.M.; Sir J. W. B. Hodsdon, M.D.; Sir David Wallace, C.M.G., M.B., C.M.; Alexander Miles, M.D., C.M.; J. W. Dowden, M.B., C.M.; A. A. Scot Skirving, C.M.G., M.B., C.M.
Clinical Medicine—J. C. Meakins, M.D.; R. A. Fleming, M.D.; Harry Rainy, M.A., M.D.; D. Chalmers Watson, M.D.; Edwin Bramwell, M.D.; Edwin Matthew, M.D.
Clinical Gynæcology—J. Haig Ferguson, M.D.; William Fordyce, M.D., C.M.; R. W. Johnstone, M.D.; James Young, M.D.
Systematic Gynæcology—
Midwifery (to Women)—J. W. Ballantyne, M.D.
Diseases of the Eye—J. V. Paterson, M.B., C.M.; A. H. H. Sinclair, M.D.; H. M. Traquair, M.D.; E. H. Cameron, M.B.
Clinical Instruction on Diseases of Children—J. Stewart Fowler, M.D.; John Fraser, M.D.; Charles McNeil, M.D.; N. S. Carmichael, M.B.
Embryology and Vertebrate Zoology—J. Beard, D.Sc.
Anatomy—E. B. Jamieson, M.D.; F. E. Jardine M.B.; W. Quarry Wood, M.B.
Applied Anatomy—F. E. Jardine, M.B.
Histology—R. K. S. Lim, M.B.
Physiological Chemistry—W. W. Taylor, D.Sc.
Experimental Physiology—May L. Walker, M.A., B.Sc., M.B.
Physiology of the Nervous System—A. Ninian Bruce, M.D., D.Sc.
Experimental Pharmacology—W. C. Sillar, M.D., B.Sc.
Materia Medica—C. G. Lambie, M.B.
Pathology, Practical—F. E. Reynolds, M.B.
Pathology—G. W. M. Findlay, M.B.
Bacteriology—J. E. McCartney, M.B.
Morbid Anatomy—W. A. Alexander, M.B.
Physics G. A. Carse, M.A., D.Sc.
Diseases of the Larynx, Ear and Nose—A. Logan Turner, M.D.; John S. Fraser, M.B.; John D. Lithgow, M.B.
Tropical Diseases—D. G. Marshall (Lt.-Col., I.M.S.)
Med. Entomology and Parasitology—J. H. Ashworth, D.Sc., F.R.S.
Tropical Hygiene—J. B. Young, M.B., D.Sc. (conjointly with Professor).
Diseases of the Skin—Norman Walker, M.D.: Frederick Gardiner, M.D.; R. Cranston Low, M.B.
Clinical Instruction in Infectious Fevers—Alexander James, M.D.; Claude B. Ker, M.D.
History of Medicine—J. D. Comrie, M.A., B.Sc., M.D.
Neurology—Edwin Bramwell, M.D.
Surgical Pathology—J. M. Graham, M.B., Ch.M.
Practical Anæsthetics—J. Stuart Ross, M.B., Ch.B. (Demonstrator).
Venereal Diseases—David Lees, M.B.

Practical Instruction is afforded, under the superintendence of the Professors, in Laboratories with the necessary appliances, and in Tutorial and Practical Classes connected with the above Chairs, and opportunities are afforded to Students and Graduates to extend their practical knowledge and engage in original research. Opportunities for Hospital Practice are afforded at the Royal Infirmary, the Hospital for Sick Children, Maternity Hospital, the City Fever Hospital, and the Asylum for the Insane. Upwards of 2760 beds are available for the Clinical Instruction of Students of the University. Four Degrees in Med. and Surg. are conferred by the Univ. of Edinburgh, viz.; Bachelor of Med. (M.B.), Bachelor of Surg. (Ch.B.), Doctor of Med. (M.D.), and Master of Surg. (Ch.M.). The minimum Class Fees for M.B. and Ch.B., including Hospital Fee (£12), amount to about £200, and the Matric. and Exam. Fees to £45 3s. An additional Fee of £21 is payable by those who proceed to M.D., and £21 by those who proceed to Ch.M. The annual value of the Bursaries, Prizes, Scholarships, and Fellowships in the Faculty of Med. amounts to about £3,600, and that of the other Bursaries, etc., tenable by Students of Med., amounts to about £1,800.

Courses of instruction are given for the Degrees of B.Sc. and D.Sc. in Public Health and for the University Diplomas in Public Health, Tropical Medicine and Hygiene, and Psychiatry. These Diplomas are open to approved registered practitioners as well as to graduates in Medicine and Surgery of the University.

In the University Laboratories facilities will be provided for candidates for the Degree of Ph.D. whose applications to engage in research have been accepted by the Senatus.

A Syllabus and further information as to Matriculation, the Curricula of Study for Degrees, etc., may be obtained from the Dean of the Faculty of Medicine, and for Degrees in the Faculties of Arts, Science, Divinity, Law, and Music, from the Deans of these Faculties; or from the Registrar, and full details are given in the University Calendar, published by James Thin, 55, South Bridge, Edinburgh. Price by post, 6s. By Authority of the Senatus,

October, 1921. WILLIAM WILSON, *Secretary*.

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UNIVERSITY OF LIVERPOOL

FACULTY OF MEDICINE.

The University grants degrees in Medicine, Surgery, Hygiene, Orthopædic Surgery, Dental Surgery, and Veterinary Science, and Diplomas in Public Health, Tropical Medicine, Veterinary Hygiene, Medical Radiology and Electrology, and a Licence in Dental Surgery.

Students may also prepare in the University for the examinations of other licensing bodies.

Medical School Buildings.—The buildings of the Medical School are all modern, and contain spacious lecture rooms, and well-equipped laboratories and class-rooms for the study of all the more important subjects which form the basis of medicine. In addition, laboratories are provided for medical research in Bio-chemistry, Tropical Medicine, Physiology, Pathology, Bacteriology, and Hygiene.

Hospitals.—The Clinical School consists of four general hospitals—the Royal Infirmary, the David Lewis Northern Hospital, the Royal Southern Hospital, and the Stanley Hospital; and of five special hospitals; the Eye and Ear Infirmary, the Hospital for Women, the Royal Liverpool Children's Hospital, St. Paul's Eye Hospital, and St. George's Hospital for Skin Diseases. These hospitals contain in all a total of about 1134 beds.

Fellowships and Scholarships.—Fellowships, Scholarships, and prizes of over £1000 are awarded annually. There are also numerous Entrance Scholarships. Particulars may be obtained on application.

The following Prospectuses may be obtained on application to the Registrar:—**Medical Faculty, School of Tropical Medicine, School of Dental Surgery, School of Veterinary Science, and Diploma in Public Health.**

R. E. KELLY, C.B., M.D., B.Sc., F.R.C.S.

UNIVERSITY of ABERDEEN Founded 1494.

FACULTY OF MEDICINE.

THE Degrees in medicine granted by the University are—Bachelor of Medicine, Bachelor of Surgery, Doctor of Medicine, and Master of Surgery. The Degree of Ph.D. is also granted in this Faculty. They are conferred only after Examination, and only on Students of the University. Women are admitted to instruction and graduation on the same footing as men. A Diploma in Public Health is conferred after Examination on Graduates in Medicine of the University of Aberdeen, or of any University whose medical degrees are recognized as qualifying for registration by the General Medical Council of the United Kingdom. The Faculty of Medicine embraces twelve chairs, from which instruction is given in all the main branches of Medical Science.

Practical Classes in connection with these chairs are conducted by the Professors and Assistants in Laboratories furnished with all the necessary appliances; and opportunities are afforded to Students and Graduates to extend their practical knowledge and engage in original research.

Instruction is also given in special departments of Medical Practice by Lecturers appointed by the University Court.

Clinical instruction is obtained in the Royal Infirmary, Royal Lunatic Asylum, the Sick Children's Hospital, the City (Fever) Hospital, the General Dispensary, Maternity Hospital and Vaccine Institutions, and the Ophthalmic Institutions.

Bursaries, Scholarships, Fellowships and Prizes, to the number of **50** and of the Annual Value of **£1183**, may be held by Students in this Faculty.

The cost of Matriculation, Class and Hospital Fees for the whole curriculum, inclusive of the fees for the Degrees, is approximately **£247.**

A Prospectus of the Classes, Fees, &c., may be had on application to—

H. J. BUTCHART, *Secretary.*

Royal College of Surgeons of Edinburgh

FOUNDED 1505.

Copies of the Regulations for the Fellowship, Licence, and Licence in Dental Surgery, with dates of Examinations, Curricula, etc., for the year 1922, are now ready, and may be had on application to—

D. L. EADIE, 49 LAURISTON PLACE, EDINBURGH, *Clerk of the College.*

Medical Defence Union,

INCORPORATED 1885. LIMITED,

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THE OBJECTS OF THE UNION ARE AS FOLLOWS:

I.—To support and protect the character and interests of Medical Practitioners practising in the United Kingdom.

II.—To promote honourable practice, and to suppress or prosecute unauthorized practitioners.

III.—To ADVISE and DEFEND or assist in defending Members of the Union in cases where proceedings involving questions of professional principle or otherwise are brought against them.

TERMS OF MEMBERSHIP.—The Annual **SUBSCRIPTION** is **£1,** payable on JANUARY 1ST OF EACH YEAR, with **an entrance fee of 10s.** payable on joining the Union. The Member has also to guarantee a certain sum (not less than £1) which forms the extent of his liability. Newly registered medical practitioners are admitted to membership without payment of an Entrance Fee, provided they join the Union within one year of the date of their Registration. A Member elected on or after 1st July in any year is only required to pay half the current subscription for that year. The privileges of a Member are personal to himself.

The Guarantee Fund exceeds £12,000, and is available should any occasion require its being called up, but up to the present time all claims for administration, legal, and other costs have been defrayed out of income.

Application Forms, Copies of last Report, and any other information can be obtained by applying to the Secretary at the Registered Offices.

LABORATORIES OF PATHOLOGY AND PUBLIC HEALTH

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President:
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PRINCIPAL OBJECTS.

To protect, support, and safeguard the character and interests of legally qualified Medical and Dental Practitioners; to advise and assist Members of the Society in matters affecting their professional character and interests; and to indemnify them in regard to actions, etc., undertaken on their behalf.

INDEMNITY AGAINST DAMAGES.

Members of the London and Counties Medical Protection Society are not only indemnified against the cost of defending or conducting actions undertaken on their behalf by the Society, whether as plaintiffs or defendants, but are also, subject to the provisions of the Articles of Association, indemnified, up to £3,000 in any one year for any one Member, against the damages and costs of the other side which may be awarded against them in cases which the Society has defended or conducted on their behalf, but in which it has not been successful.

Provision has been made for the latter purpose of an available sum of £24,000 per annum.

IMPORTANT NOTICE.

The Society is subject to no control by its Underwriters or by any other outside body in the conduct of its business or in the matter of appeal. The management of the cases referred to the Society rests entirely with the Council.

Entrance Fee, 10/-. Subscription, £1 per annum.

The Invested Funds of the Society, taken at their market value as on the 1st January, 1921, amounted to £26,165.

Forms of Application for Membership and full particulars can be obtained from—

The Secretaries, 32, CRAVEN STREET, STRAND, LONDON, W.C. 2

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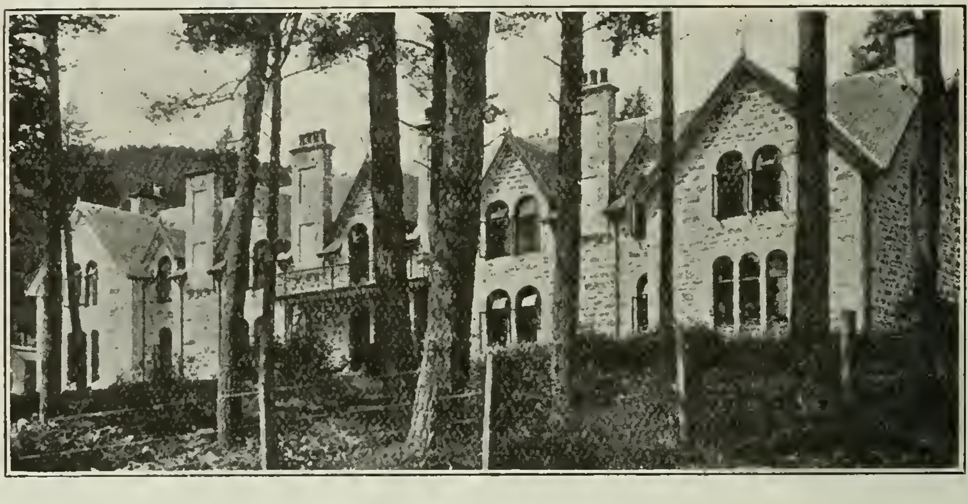

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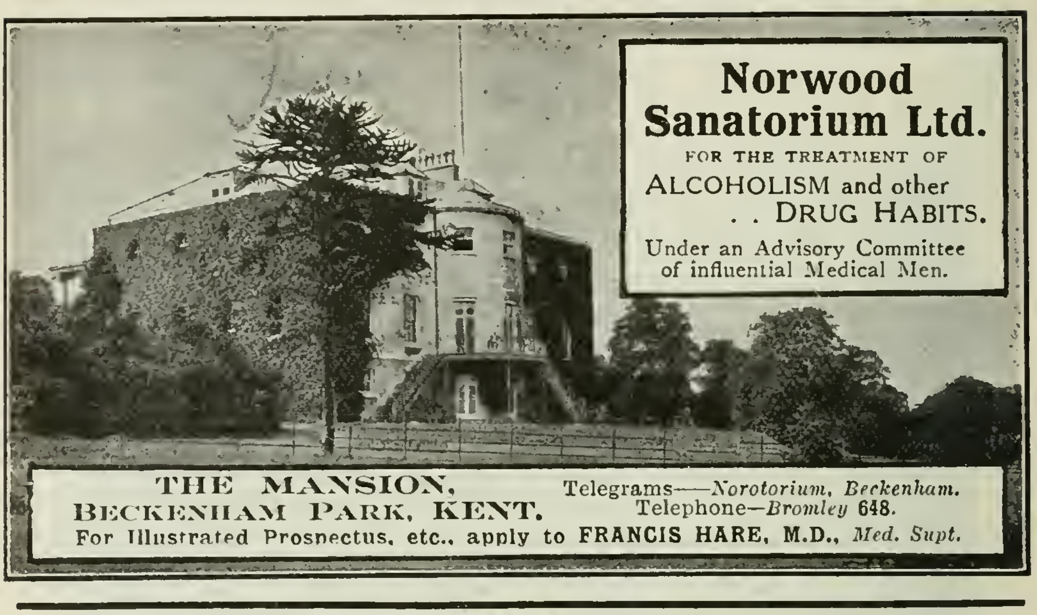

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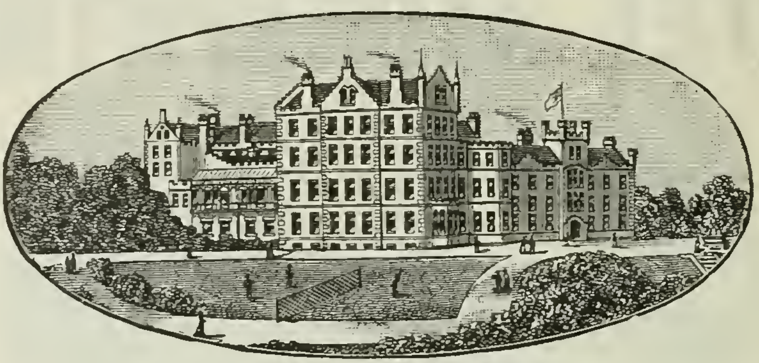

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FOR MENTAL DISEASES,

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FOR THE UPPER and MIDDLE CLASSES ONLY.

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Hospital for Mental Diseases.

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A Registered Hospital for the Care & Treatment of both Sexes of the Upper and Middle Classes, when suffering from Nervous and Mental Disorders. . .

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Physician Superintendent, ALEX. W. NEILL, M.D.

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CHEADLE, CHESHIRE.

THIS Hospital for **MENTAL DISEASES** with its Seaside Branch GLAN-Y-DON, COLWYN BAY, is for the TREATMENT of PRIVATE PATIENTS of the UPPER and MIDDLE CLASSES. :: Voluntary Boarders received.

For Terms, etc., apply to the Superintendent, **J. SUTCLIFFE, M.R.C.S.**, or he may be seen at 72, BRIDGE STREET, MANCHESTER, on Tuesdays and Fridays, from 2.0 to 3.0. *Telephone:* **208 Cheadle Hulme.**

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A REGISTERED HOSPITAL for MENTAL DISEASES, situated in the City of Lincoln, near to the Cathedral.

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Licensed for 22 Ladies of the Upper & Middle Classes. The House stands in extensive well-wooded Grounds within the boundary of the city.

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Telegrams :
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Private MENTAL HOSPITALS.

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HAMPSTEAD, Glasnevin, for Gentlemen | HIGHFIELD, Drumcondra, for Ladies.

For the Cure and Care of Patients of the Upper Class suffering from Mental and Nervous Diseases and the Abuse of Drugs.

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DERBY MENTAL HOSPITAL.

ALBANY HOUSE, a Detached Block for FEMALE PRIVATE PATIENTS.

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A SANATORIUM OF THE HIGHEST CLASS FOR THE

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The Resident Physician may be seen at the Grange; or at Leavygreave House, Hounsfield Road, Sheffield, by appointment. (Nat. Tel. No. 34, Rotherham.)

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An old-established and modernized Institution for the Medical Treatment of Ladies and Gentlemen Mentally Afflicted.

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For further Particulars apply to the MEDICAL SUPERINTENDENT.

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A Sanatorium for Ladies and Gentlemen suffering from Nervous and Mental Disorders.

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For further information, see London Medical Directory, p. 2215, and for Terms, etc., apply to Dr. J. D. THOMAS, Resident Medical Proprietor, Northwoods House.

Dr. THOMAS *attends at* 64, *PARK STREET, BRISTOL, on Mondays and Thursdays, from* 12 *to* 1.30 *o'clock.*

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THE COMMITTEE OF VISITORS are prepared to receive

PRIVATE PATIENTS on Moderate Terms.

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ARRANGED and furnished with all the most approved appliances for the treatment, comfort and amusement of the Inmates. Within two miles of the Railway Station, and easily accessible by Rail from London and all parts of the Kingdom. It is beautifully situated at the foot of the Cotswold Hills, and stands in its own grounds of 250 acres. Voluntary Boarders not under certificates are admitted. The MANOR HOUSE for Ladies only, which is entirely separate from the Hospital and standing in its own grounds, is being utilized exclusively for voluntary patients.

For Terms, etc., apply to ARTHUR TOWNSEND, M.D.,
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PLYMPTON HOUSE is licensed for the accommodation of both sexes, and is well adapted by its position and appointments for the **Medical Treatment and Care of Patients of the Upper and Middle Classes, suffering from MENTAL DISEASE.**

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For the Treatment of Mental Diseases.

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FORMBY-BY-THE-SEA.

Telephone: No. 8 FORMBY. *Near LIVERPOOL.*

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A Registered Hospital for the Treatment of MENTAL DISEASES.

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Under the management of a Committee of Members of the Society of Friends. Situated about two miles from York Station. The Patients are derived from the **Upper and Middle Classes,** and none are paupers or rate-aided. **Terms from £6 6s. weekly.**

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For further particulars see the Annual Report, which will be sent on application to **Dr. BEDFORD PIERCE, the Medical Superintendent.**

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For Terms, etc., apply to the **MEDICAL SUPERINTENDENT.**

LONDON COUNTY MENTAL HOSPITAL,

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Private Patients. Special Accommodation for Male Paying Patients is provided at "THE HALL," adjoining this Mental Hospital.

TERMS, exclusive of clothing and special luxuries, for Patients having a legal settlement in the County of London, **63s.** a week; for others, **73s. 6d.** a week.

Full particulars can be obtained on application to the **Asylums Officer, London County Council, Fitzalan House, 13 Arundel St., Strand, W.C. 2.**

All applications will be considered in the order in which they are received.

Established 1826.

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Telegrams: **"Alleviated, London."** *Telephone:* **New Cross, 576.**

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Particulars supplied on application to the

MEDICAL SUPERINTENDENT, Graylingwell Hospital, Chichester.

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The Medical Superintendent, The Hospital, HELLINGLY.

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For further particulars and necessary forms apply to the **Medical Superintendent.**

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Telephone: 346 P.O. Epsom.

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Telegrams— 130 BUXTON. **BUXTON, DERBYSHIRE.** *Telephone—* BUXTON 130.

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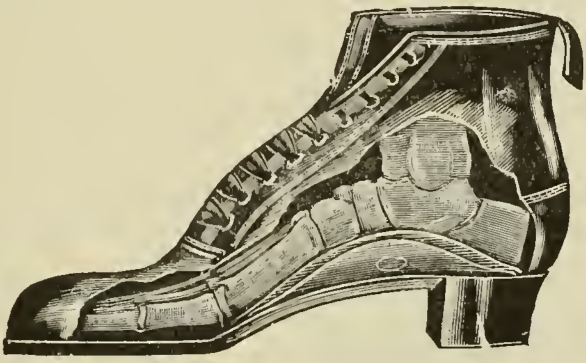

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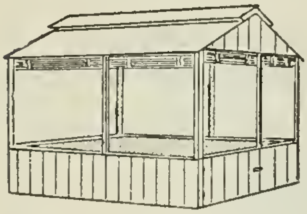

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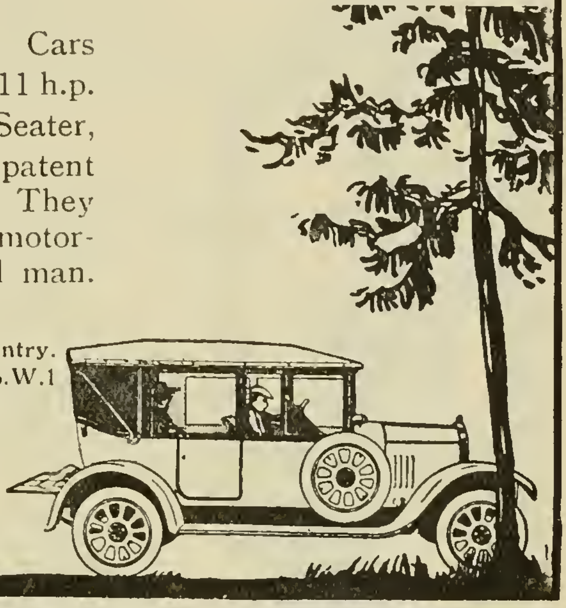

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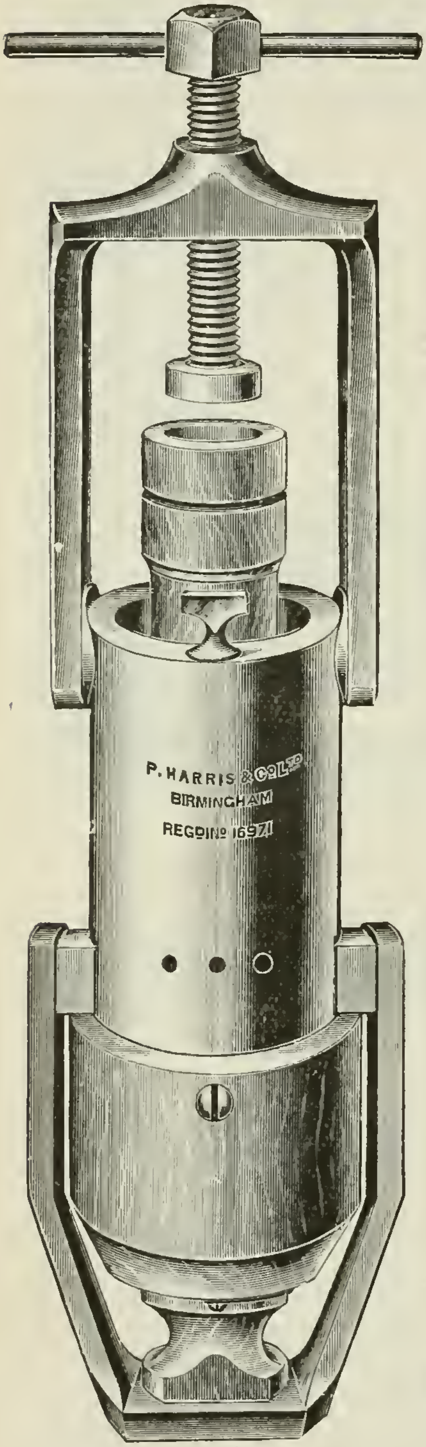

Fig. 7.

The "Hall-Edwards" Carbon Dioxide Snow Collector and Compressor.

Apparatus for Collecting and Applying Carbon Dioxide Snow.

SEE THE LITTLE MANUAL:—

CARBON DIOXIDE SNOW: Its Therapeutic Uses. By J. Hall-Edwards, L.R.C.P., F.R.S. (Edin.), Hon. F.R.P.S. London: Simpkin, Marshall, Hamilton, Kent & Co., Ltd. 1913. *Crown 8vo, pp. 93.* **3s. 6d.** *net.*

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ADVANTAGES:—The Collector not only admits of obtaining the small and necessary amount of snow for one treatment without undue waste, but it renders it unnecessary to transfer the snow from one piece of apparatus to another.

The snow is always of the same hardness and the test of complete and proper compression is that the cone should sink in water.

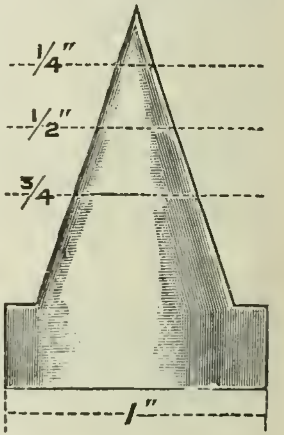

Fig. 9.

Fig. 9.—Diagram of Compressed Snow, showing broad base and cone-shaped projection. The transverse lines indicate the positions for cutting off the cone so as to produce a circle of any desired diameter.

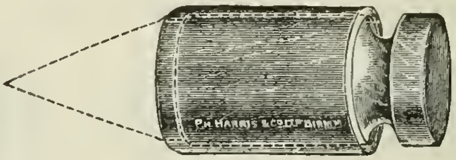

Fig. 10.

Fig. 10.—The applicator showing cone of compressed snow projecting from its lower end.

SET No. I.—

Hall-Edwards' Improved Set for producing CO₂ Hard Snow, comprising:—Collector, fitted with top and bottom stirrup compressor (*see Fig.* 7), Special Rammer and Metal Rods, also used for producing compressed **small pencils** of hard snow, Hardwood Applicator for holding cone of snow (*see Fig.* 10), Special Nipple and Union for attaching to Cylinder. The above apparatus is made of Lignum-Vitæ and Delta Metal, nickel plated .. .. complete **£4 4 0**

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Same as specification No. 1, but including a **4 lb. Cylinder** filled with CO_2, Key and Metal Stand for holding Cylinder.. .. complete **£6 6 0**

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Full Particulars on Application, and sent with each set.

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Negative Pressure treatment of Chronic Gonorrhœa

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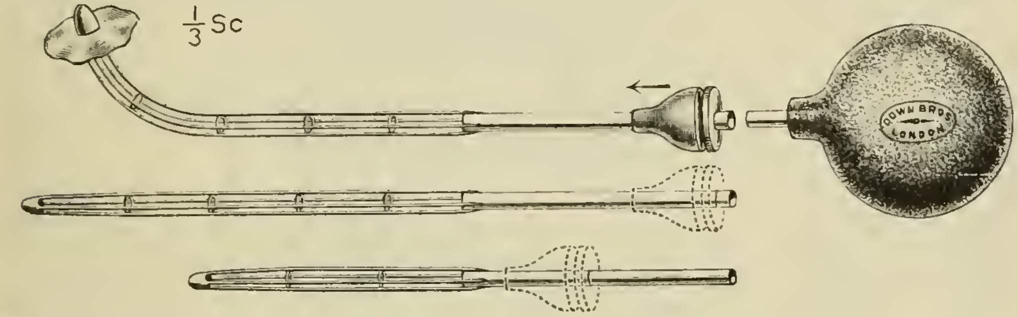

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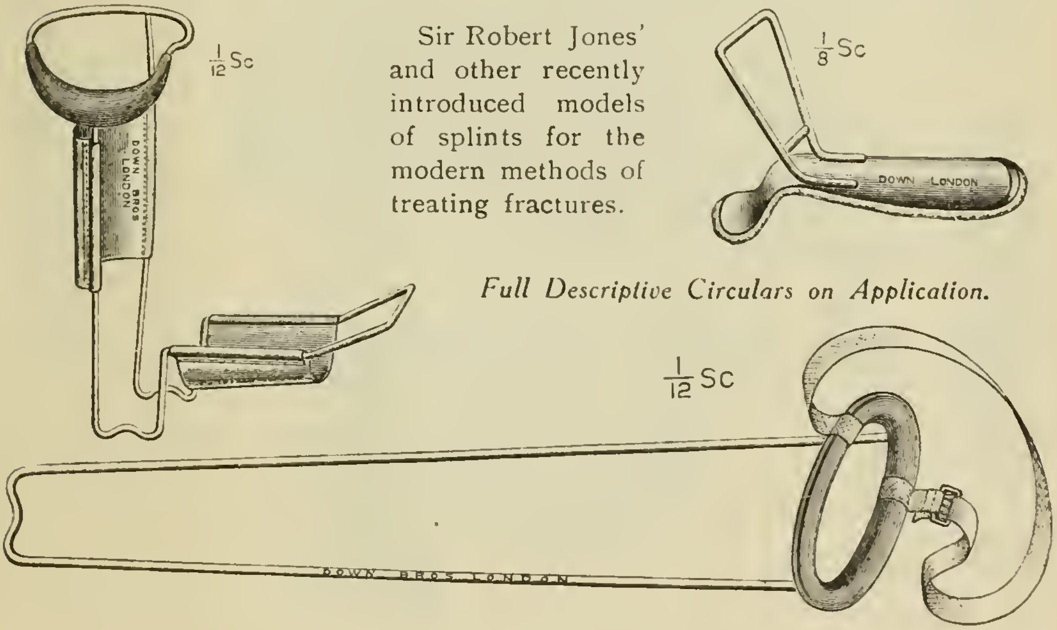

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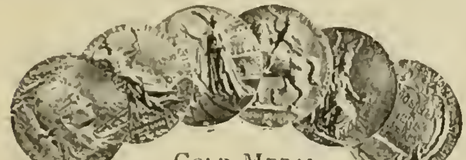

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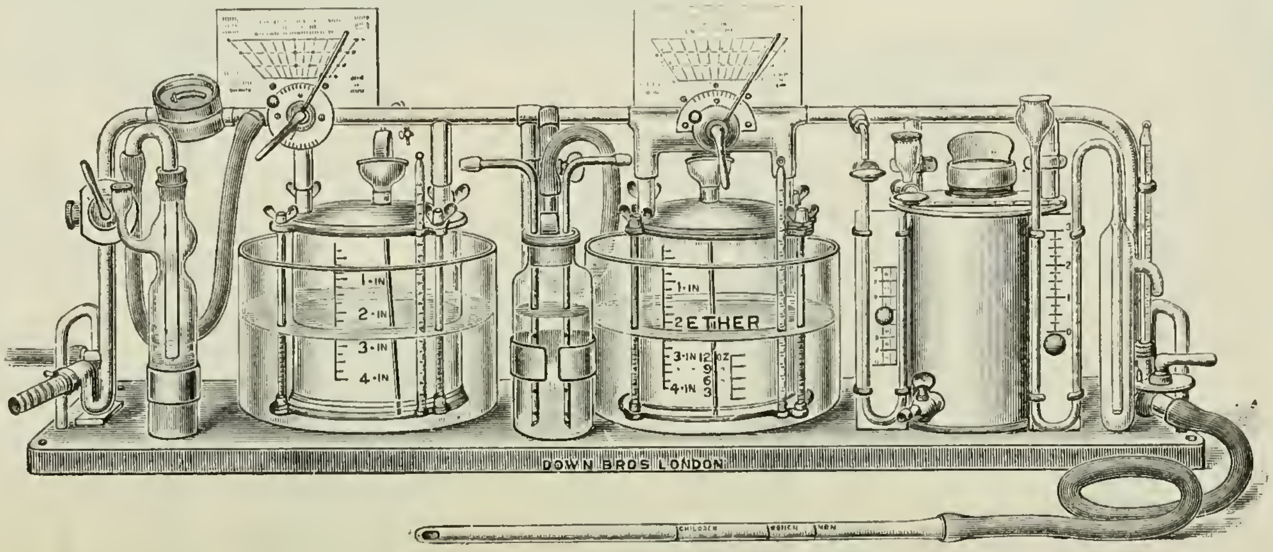

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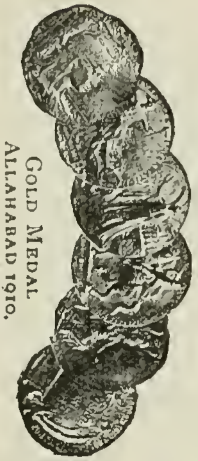

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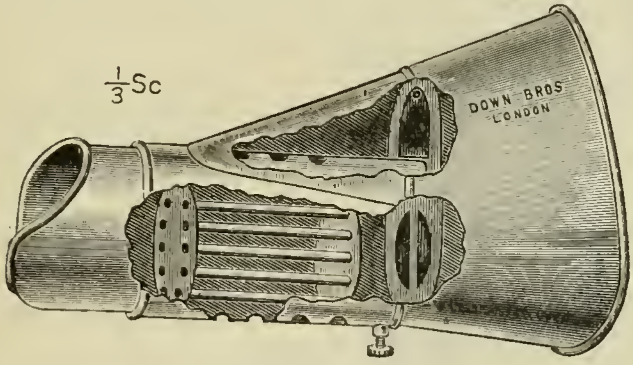

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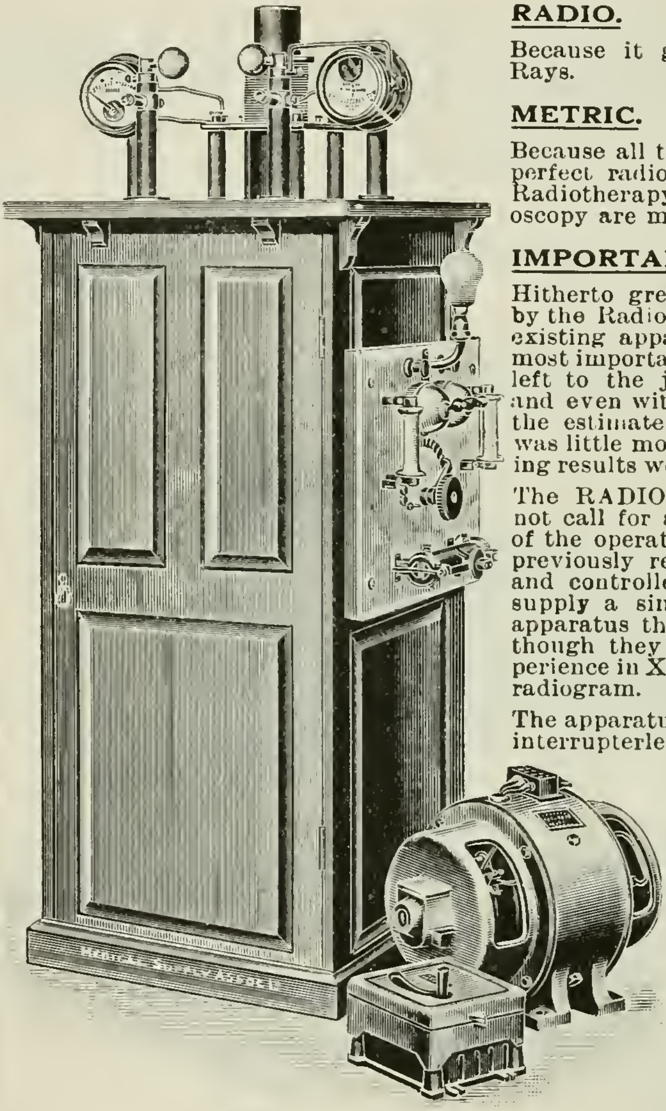

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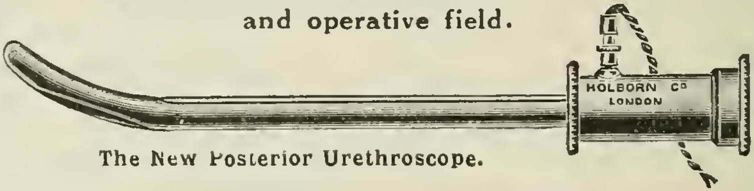

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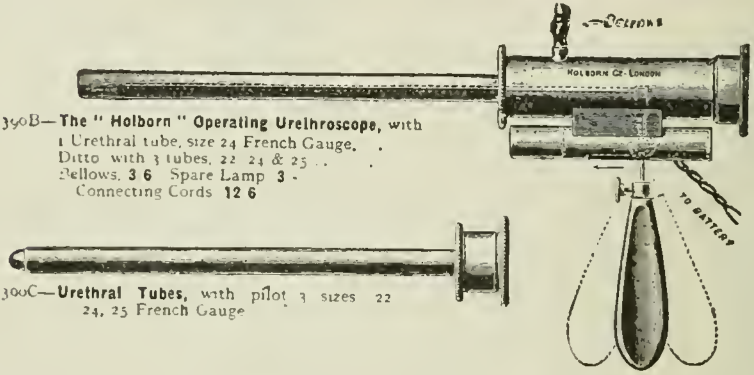

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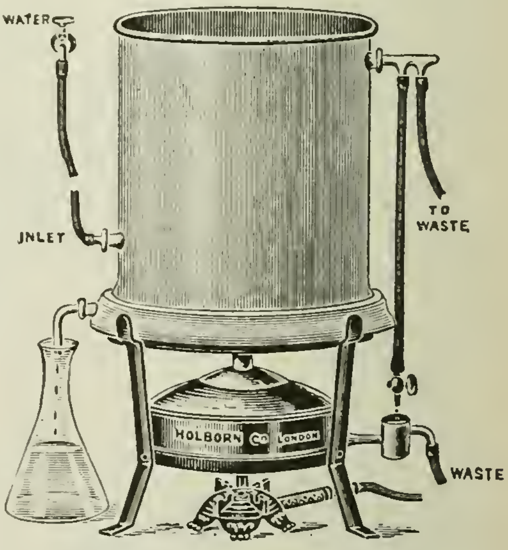

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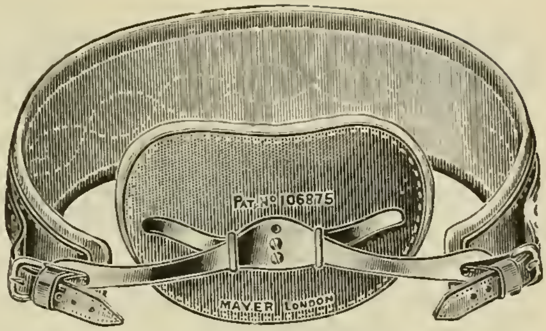

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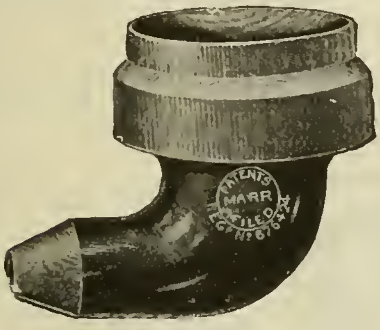

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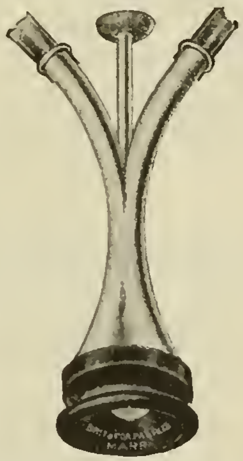

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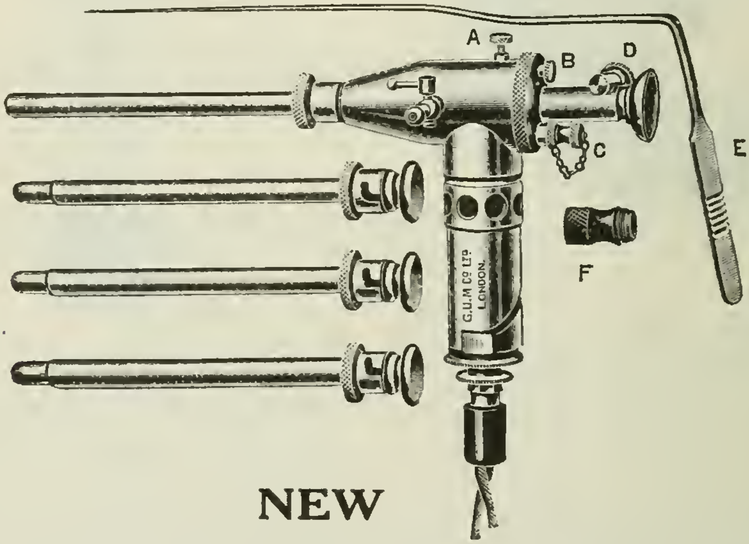

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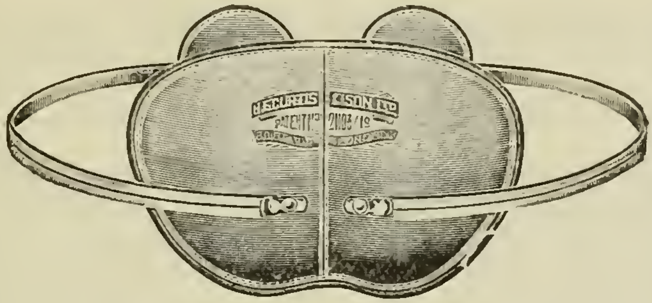

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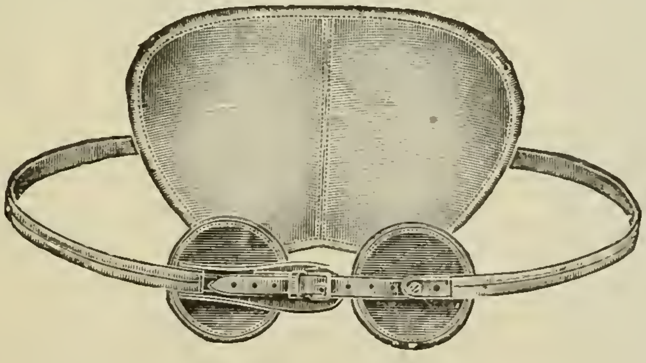

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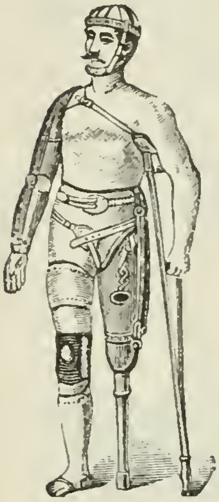

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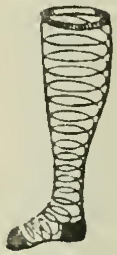

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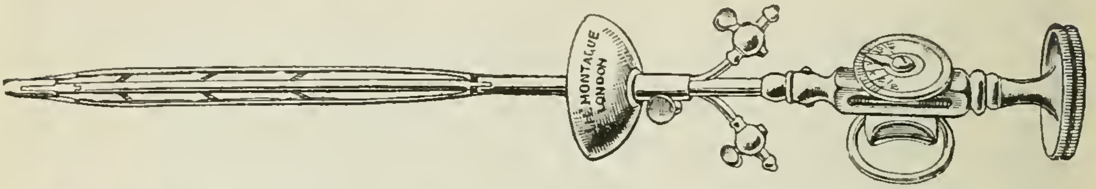

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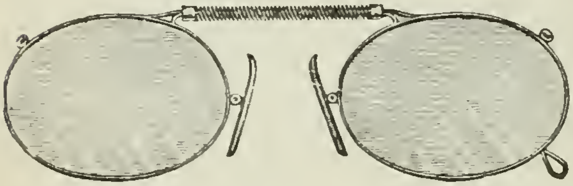

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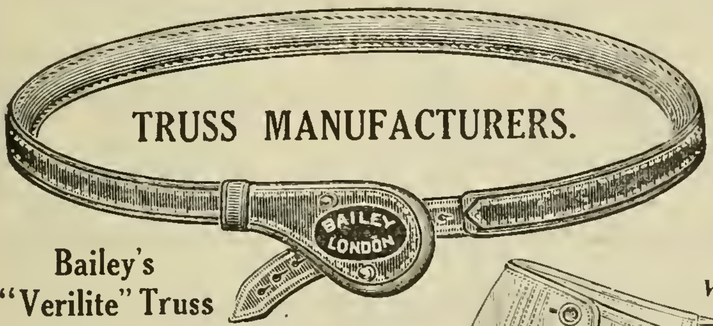

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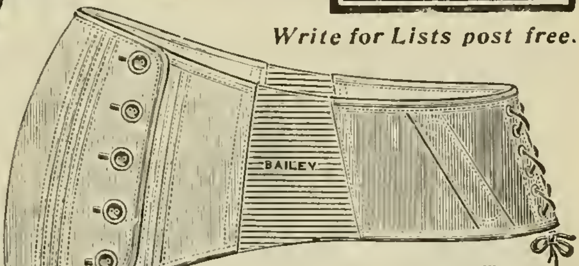

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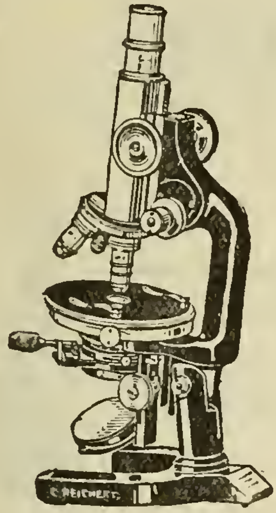

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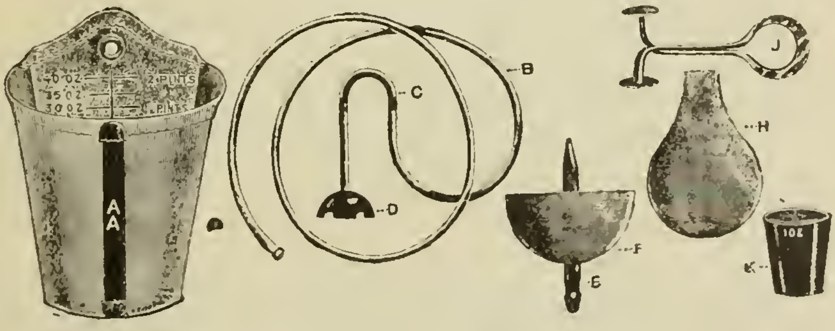

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This letter (written with the left hand) is intended to convey my intense gratitude for the NEPENTHE received on Tuesday.

On December 20th I had a cycle accident, resulting in severe concussion, and a compound comminuted T-shaped fracture of the lower end of right humerus, communicating with the joint.

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Morphia, though clearly indicated, was given with dire results—foul tongue, headache, and, worst of all, intense skin irritation; the after-effects of the morphia were so marked, that it had to be stopped. Various hypnotics had been tried and proved useless, and in desperation a dose of Morphia was given on Monday night; result—intense urticaria, swollen lips, hands and joints.

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Yours faithfully,.

——— ———, M.B., C.M., (Aberdeen).

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